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UNIVERSITY OF TORONTO

Report of the Dean

of the

Faculty of Medicine

Session 1966-1967

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THE DEAN OF THE FACULTY OF MEDICINE

The most conspicuous fact facing any faculty of medicine today is the phenomenal speed at which advances in knowledge demand changes in programmes and the physical facilities which accompany them.

In last year's *Report*, former Dean Hamilton remarked on the progress made in providing for a superb new Medical Sciences Building. This has already begun to take shape. Unfortunately at the time of writing there is a construction workers' strike which if prolonged may delay by a year from September, 1969, to September, 1970, our intake of an enlarged class in medicine.

Dr. Hamilton also alluded to the development of major construction for teaching and research in our teaching hospitals. It may not be realized that the medical school now embraces seven major general hospitals, plus three specialty hospitals with a patient population of approximately 9,000. The specialty hospitals are the Hospital for Sick Children, the Clarke Institute of Psychiatry and the Princess Margaret Hospital. The general hospitals are Toronto General, Toronto Western, St. Michael's, Wellesley, Women's College, New Mount Sinai and Sunnybrook.

The federal government has provided in the Health Resources Fund a special means for supporting educational projects in the health field. As an index of the magnitude of the problem within the University group of hospitals, including our Medical Sciences Building, the Provincial Health Department has identified approximately $300,000,000 in requests attributable to capital costs for health education purposes. The Hospital Services Commission has indicated that it must rely on the University to show what are the necessary requirements for teaching, both undergraduate and post graduate, and for research ascribed to these institutions. This means that the hospitals, which in the past have looked chiefly to the community to support their individual programmes, must now come together to plan collectively. Only in this way can unjustified duplication of highly specialized and expensive facilities be prevented.

Dr. Hamilton had paved the way for these considerations with the chairmen of the hospital boards a year or two previously. Several meetings throughout the present year have established agreement in principle that a medical centre composed of the teaching hospitals in voluntary affiliation should be established, the main purpose of the organization being to provide for comprehensive integrated development of medical and health education within the University. The directors and superintendents of these hospitals have been meeting with the Dean and his advisers monthly since last August, a line of communication which has proved valuable to all. In addition it is hoped to develop a full-time secretariat to identify and delineate those problems which will require decisions by the chairmen of the respective hospitals, in their capacity as a Medical Centre Board. In support of the latter programme we have obtained help from the Health Resources Fund to set up a functional planning unit for the Medical School.

A major addition to the Medical Centre occurred in October, 1966, when the University took over the operation of Sunnybrook Veterans' Hospital. This has necessitated the recruitment of professional academic staff to operate the services presently provided, to plan the conversion of a large part of this enormous plant from a military to a community type hospital, and to prepare for its function as a major clinical teaching and research facility for the health sciences of the University.

Another important addition has been the decision to include the Banting and Best Department of Medical Research within the organization of the Faculty of Medicine.

Further impetus to the research programme in medicine has been the acceptance by the Graduate School of a new Clinical Sciences Institute. This will enable clinical divisions of the school to enrol graduate students directly, and hopefully will greatly increase our supply of clinical scientists for the educational institutions so urgently

needed by our own expanding school as well as by the newly developing schools throughout the country.

The undergraduate curriculum which has been under study for some years is now receiving a major overhaul. As a result of preliminary studies by the special committees for basic sciences and clinical studies, the Faculty Council approved a feasibility study for an entirely new approach.

The new curriculum studies are based to a large extent on the programme devised at Western Reserve University. Under this method, teaching is conducted by systems committees, i.e. heart, respiratory, neurological, etc. The systems are divided into three main parts: part I dealing with the normal functioning of the system; part II with the mechanisms of disease involving the system; part III with disease in man. Facilities to accommodate this type of instruction must be built into the programme of expansion presently under consideration by our teaching hospitals. The design of the laboratories in our Medical Sciences Building lends itself to this approach.

In addition to altering the method of presenting the curriculum, the Faculty has taken note of the major advances in the field of molecular biology, and has recommended the formation of a division of cell biology in Medicine to ensure an adequate presentation of this subject to the student. The Faculty has also recognized the need to give the student a better understanding of the individual and the community, and has endorsed the development of a division of behavioural science to cover this need in our plan of education.

A Medical Educational Research Unit has been established to assist Faculty in improving their teaching and to study the effective uses of many of the newer instructional devices, including television, in the presentation of medical subjects as measured by student performance.

The postgraduate training of individuals for family practice or for the specialties in medicine has been on the periphery of University concern. However, it is encouraging that the increasing demands made on clinical teachers in this regard have been recognized at least in part by the new programme of formula financing.

An equally important factor in the field of postgraduate training, which affects undergraduate education as well, is the onset of universal health insurance. Both the profession and the public will have to adapt themselves realistically to this change if adequately trained physicians are to be available for the future.

Teaching physicians, while maintaining close supervision, must continue to delegate responsibility for their patients to residents and students according to their competence. The public at all levels must recognize their responsibility to co-operate in this proven and established educational structure. Medical education is truly dependent on a team rather than on an individualistic approach.

The concept of the health team involving many disciplines, medicine, nursing, dentistry, social work, occupational therapy, clinical psychology, etc., appears to be the solution to providing health care for the community in the future. Much thought and planning will have to go into our educational programmes to educate students from various professions in the co-operative rather than the independent approach to the health needs of the individual in our community.

Finally, I wish to express my sincere appreciation to all those members of the Faculty who have devoted many extra hours to the committee work involved in planning the curriculum and many other aspects associated with the expansion of the medical school programme. In addition I would like to thank the organizations, companies and individuals who have so generously supported our research projects.

Research

Abbott Laboratories Limited; Alcoholism and Drug Addiction Foundation; American Medical Association; The Atkinson Charitable Foundation; Ayerst McKenna Harrison; Banting Research Foundation; J. P. Bickell Foundation; British Drug Houses; Burroughs, Wellcome and Company; Canadian Arthritis and Rheumatism Society; Canadian Cystic Fibrosis Association; Canadian Diabetic Association;

Canadian Foundation for Advancement of Therapeutics; Canadian Heart Foundation; Canadian Life Insurance Officers' Association; C.I.B.A. Foundation; The Commonwealth Fund; The Connaught Medical Research Laboratories; The James H. Cummings Foundation; Cyanamid of Canada Limited; The Defence Research Board; Department of Health (Provincial); Department of National Health and Welfare; Dominion Stores Limited; Eaton Endowment Account; James Franceschini Foundation; Lederle Foundation; R. Samuel McLaughlin Foundation; John and Mary Markle Foundation; Medical Research Council of Canada; Multiple Sclerosis Society; Muscular Dystrophy Association of Canada; National Cancer Institute; National Research Council of Canada; National Sanitarium Association; Ontario Cancer Treatment and Research Foundation; Ontario Heart Foundation; Ontario Mental Health Foundation; Ontario Society for Crippled Children; Ontario Tuberculosis Association (Ontario Thoracic Society); Poulenc Limited; Queen Elizabeth II Canadian Fund; Rehabilitation Fund for the Disabled; Rockefeller Foundation; Rubin Corporation; Schering Corporation Limited; Syntex Limited; United States Army Medical Research & Development Command; United States National Institutes of Health; Warner Lambert Research Institute of Canada; Wynola Corporation.

Visitors

During the academic session many prominent physicians and scientists visited the Faculty. These included:

Department of Anaesthesia: Professor F. H. Van Bergen, University of Minnesota, who gave the eighth Dr. Harry Shields Lecture; Dr. Lucien Morris, Seattle; Dr. Margaret McClelland, Royal Children's Hospital, Melbourne, Australia; Dr. Mary Burnell, North Adelaide, South Australia; Dr. Herbert H. Pinkerton, Western Infirmary, Glasgow; Dr. J. H. Sando, Adelaide, South Australia; Dr. Samuel A. Oduntan, University of Ibadan, Nigeria: Dr. Alvar Swensson, Karolinska Children's Hospital, Stockholm.

Department of Anatomy: Dr. J. C. Allan, University of Witwatersrand, Johannesburg; Dr. Harry Harris, Galton Professor of Human Genetics, University of London; Dr. R. F. J. Withers, Department of Biology as Applied to Medicine, Middlesex Hospital, London; Dr. Graeme Schofield, Monash University, Victoria, Australia; Dr. A. Mohiuddin, University of Lagos, Nigeria.

Department of Biochemistry: Dr. L. S. Penrose, Harperbury Hospital, Herts, England; Dr. G. Tener, University of British Columbia; Dr. R. W. Estabrook, Johnson Foundation, University of Pennsylvania; Dr. J. W. Hastings, Harvard University; Dr. J. C. Skou, Aarhus University, Aarhus, Denmark; Dr. Gregorio Weber, University of Illinois; Dr. G. H. Dixon, University of British Columbia; Dr. Edward Herbert, University of Oregon.

Department of Art as Applied to Medicine: Mr. Jorge Perez Vela, Mexico City.

Department of Medicine: Dr. D. O. Anderson, Vancouver; Dr. A. Angel, Montreal; Dr. C. Aring, Cincinnati; Dr. L. F. Belanger, Ottawa; Dr. R. Borth, Geneva, Switzerland; Dr. K. Clark, St. Thomas, Ontario; Dr. A. J. Cooper, Timmins, Ontario; Dr. T. E. Cuddy, Winnipeg; Dr. J. V. Dacie, London, England; Dr. J. C. Dawson, Calgary; Dr. J. Dickenson, London, England; Dr. N. Drury, England; Dr. L. Duncan, Edinburgh; Dr. R. Fernando, Manila, Philippines; Dr. E. J. Freireich, Houston, Texas; Dr. P. Gautier-Smith, London, England; Dr. E. R. Giblett, Seattle, Wash.; Dr. P. Heaton, Ottawa; Dr. B. Hudson, Melbourne, Australia; Dr. N. C. Hughes-Jones, London, England; Dr. J. Huxley, London, Engand; Dr. K. N. Jeejeebhoy, Bombay; Dr. Thomas Killip III, New York; Mrs. Langille, St. John's, Newfoundland; Dr. S. T. Laufer, Halifax; Dr. R. M. Little, Timmins, Ontario; Dr. I. Macdonald, London, England; Dr. R. Malmcrona, Gothenberg, Sweden; Dr. McGuinness, Glasgow; Dr. J. G. Wills, Calgary; Dr. J. C. Morgan, Calgary; Dr. D. S. Munroe, Vancouver; Dr. D. Price, Berkeley, Calif.; Dr. M. Read, Milbank Foundation; Dr. G. Rodnan, Pittsburgh; Dr. Roth, Washington, D.C.; Dr. D. F. Rovelli, Milan, Italy; Dr. Semple, Glasgow; Dr. N. Sinclair, London,

Ontario; Dr. S. Swisher, East Lansing, Michigan; Dr. M. F. Williams, Niagara Falls, Ontario; Dr. K. Winterhalter, Zurich, Switzerland; Dr. S. Morlledge, London, England; Dr. Zvaifler, Washington, D.C.

Department of Obstetrics and Gynaecology: Mr. G. W. Theobald, University College Hospital, London, England; Mr. David Millar, Newcastle-upon-Tyne, England; Mr. Richard Beard, Queen Charlotte Hospital, London, England; Professor C. H. Hendricks, Western Reserve University; Dr. Rudi Borth, Maternity Centre, Geneva, Switzerland.

Department of Ophthalmology: Dr. Wendell L. Hughes who gave the eighth Walter Wright Lecture; Mr. Dermot Pierse, London, England; Dr. Marshall Parks, Washington; Dr. Francis Heed Adler, Philadelphia; Dr. John E. Harris; Dr. Bernard Noell, Buffalo, N.Y.; Dr. R. M. Reed, London, Ont.; Dr. R. J. Rossiter, London, Ont.

Department of Otolaryngology: Dr. W. G. Hennenway, University of Colorado.

Department of Paediatrics: Dr. Pierre W. Duchosal, Geneva, Switzerland; Dr. Eugene J. Fischmann, Washington, D.C.; Dr. Paul Hugenholtz, Boston, Mass.; Dr. Robert Ward, Los Angeles, Calif.; Dr. Charles A. Janeway, Professor of Paediatrics, Boston Children's Hospital; Dr. Neill Begg, Dunedin, New Zealand; Professor Wilfrid Gaisford, University of Manchester; Dr. Chester M. Edelmann Jr., Albert Einstein College of Medicine, New York; Dr. Walter Hitzig, Zurich, Switzerland; Dr. Irving Schulman, University of Illinois; Dr. Murray McGeorge, Dunedin, New Zealand; Professor Andrea Prader, Zurich, Switzerland; Dr. Harry Harris, University College, London, England; Professor Douglas Hubbie, University of Birmingham; Dr. Michael Galton, Assistant Professor of Pathology, Dartmouth Medical School, Hanover, N.H.

Department of Pathological Chemistry: Dr. H. Aebi, Medizinisch-Chemisches Institut, University of Bern, Switzerland; Dr. W. Roman, Institute of Medical & Veterinary Science, Adelaide, Australia; Dr. George Weber, Professor of Pharmacology, Indiana University.

Department of Pathology: Dr. P. Grunwald, Sinai Hospital, Baltimore; Dr. M. Klemperer, Harvard Medical School; Dr. A. Engel, Mayo Clinic; Professor P. Distin, Université Libre de Bruxelles; Professor I. Berenblum, Weizmann Institute, Rehovoth; Dr. G. Crile Jr., Cleveland Clinic; Professor J. V. Dacie, Department of Pathology, Royal Postgraduate Medical School; Professor Francis Camps, Department of Forsenic Medicine, London Hospital; Dr. R. Ford, Chief Medical Examiner, Suffolk County, Mass.; Dr. R. J. Lukes, Los Angeles.

Department of Pharmacology: Dr. B. Stewart, Pharma Research Canada Ltd., Montreal, Quebec; Dr. V. Donaldson, St. Vincent Charity Hospital, Cleveland, Ohio; Dr. A. K. Goswami, University of Georgia; Dr. K. M. Knigge, University of Rochester; Dr. U. Trendelenburg, Harvard Medical School; Dr. B. G. Benfey, McGill University; Dr. D. R. Waud, Harvard Medical School; Dr. K. Raska, Rutgers Medical School.

Department of Physiology: Dr. Ivan Hihler, University of Manitoba; Dr. J. Q. Bliss, McGill University; Dr. R. DeMayer, University of Louvain, Belgium; Dr. J. W. Pearce, University of Alberta; Dr. Robert Steele, Brookhaven National Laboratory, N.Y.; Dr. A. C. Burton, University of Western Ontario; Dr. John Kraicer, Queen's University; Dr. Leslie Duncan, University of Edinburgh; Dr. J. J. Faber, University of Oregon; Dr. E. R. Arquilla, University of California, Los Angeles; Dr. Harold Sonnenberg, University of New Mexico.

Department of Psychiatry: Professor Bruce Sloane, Chairman, Department of Psychiatry, Temple University; Dr. D. Ewen Cameron, President, World Psychiatric Association; Professor Iurii Saarma, University of Tartu, Estonian S.S.R.

Department of Radiology: Professor W. P. Cockshott, Ibadan University, Nigeria; Professor Vincent P. Collins, Baylor University; Dr. M. Dufresne, University of Montreal; Dr. Robert Egan, Emory University; Dr. John W. Hope, University of Pennsylvania; Dr. Harold Jacobson, Albert Einstein Institute; Dr. M. D. Sachs, Western Reserve University.

Department of Surgery: Professor A. L. d'Abreu, Birmingham, England, who was the Gallie Visiting Professor; Professor Philip Allison, Nuffield Professor of Surgery at Oxford, who delivered the Balfour Lecture; Mr. Leslie P. Le Quesne, Middlesex Hospital, London; Mr. A. M. P. Forrest, Cardiff, Wales; Mr. Robert Shields, Cardiff, Wales; Dr. René Menguy, University of Chicago; Dr. Benjamin Rush, Lexington, Ky.; Dr. George Crile, Jr., Cleveland Clinic; Dr. Melvin Glimscher, Harvard University; Dr. Leslie Duncan, University of Edinburgh; Dr. Leroy McDaniel, Covina, Calif.; Mr. K. S. Till, Oxford, England; Mr. C. M. G. Duran, Radcliffe Infirmary, Oxford, England; Dr. Stanley Jacobs, University of Oregon; Dr. Robert Macbeth, University of Alberta; Dr. John Gutelius, McGill University.

Captain E. W. Bird, M.C., U.S.N., Head of Audio Visual Aid Training, U.S.A. Navy Bureau of Medicine and Surgery, addressed a meeting on the subject "Audio Visual Aids in Education."

A. L. CHUTE

DIVISION OF POSTGRADUATE MEDICAL EDUCATION

Under the direction of Professor R. Ian Macdonald

One of the developments from the ferment in medical education during the past decade has been a general recognition that the modern medical school must assume responsibility for the graduate and postgraduate phases of education in addition to the traditional roles in undergraduate education and research. The Faculty of this School has accepted this responsibility for many years and both the Basic Science and Clinical Departments have offered programmes of high quality. The former were recognized academically and developed without difficulty. However heads of Clinical Departments were obliged to provide for the education of their graduate and postgraduate students through a staff establishment based on undergraduate needs only and they had to take particular care to avoid both dilution of undergraduate teaching and interference with the healthy development of sound research. Over the years different committees of the Faculty recognized the problems inherent in this conflict of responsibility and interest. With the objective of insuring safe and orderly development of graduate and postgraduate programmes Faculty Council recommended administrative adjustments in 1950 and again in 1955 when this Division was established. At that time Dean J. A. MacFarlane predicted that graduate and postgraduate education in this School would increase tremendously within a decade. With characteristic foresight he believed that before many years there would be general understanding and acceptance of the need for medical schools to be given the resources to develop recognized graduate programmes in the clinical sciences and to provide opportunities for the continuing education of their graduates. His predictions have been realized; and it now seems probable that this major phase of medical education will be recognized and given necessary financial support.

During the 1966–1967 session 2,038 students registered with the Division. No registration was required for attendance at extra-mural (travelling) clinics which were attended by approximately a thousand doctors in their home communities.

Of those registered, 606 were still in the graduate phases of their education and were enrolled under different categories: Diploma Courses, 90; B.Sc. (Med.), 18; Residents, 321; Neuro-Anatomy, 34; Anatomy for Obstetricians and Gynaecologists, 12; Sessional Courses, 43; Advanced Graduate Courses in Medicine, Surgery and Obstetrics and Gynaecology, 88; total, 606.

The remaining 1,432 registrants were doctors in active practice who attended one or more of the twenty-six refresher courses designed to meet the particular needs of practitioners in general or special practice. These intra-mural courses were mostly of two or three days' duration though some extended for five days and one for ten.

The three Advanced Graduate Courses, designed to meet the needs of those who have just completed their formal training, extended over five weeks. Other continuing medical education programmes were provided: (1) Short intra-mural individual "refresher" sessions of two to four weeks (or longer) were given for practitioners who wished to brush up on subjects which seemed to be of particular importance for their practices. (2) Extra-mural travelling clinics, which have been functioning successfully since 1951, were continued. They were organized in the belief that the most effective continuing education is through the medium of clinics where teachers and doctor-students take an active part in examining patients and discussing different problems presented. Some of these clinics were scheduled for an entire day, others extended for two days and some for half a day. The financing of these clinics was originally through a grant from the Kellogg Foundation but for the last ten years it has been from other sources. Financial assistance for their support from the Ontario Heart Foundation, the Ontario Thoracic Society, and the Ontario Medical Association is gratefully acknowledged. The extra-mural travelling clinics during the past session, given in collaboration with the Medical Society in the area, were held in Belleville, Guelph, Kirkland Lake, Fort William–Port Arthur, Sault Ste. Marie, Lindsay, Peterborough, Timmins, and Welland–Port Colborne. Thirty-seven university teachers took part in nineteen clinics. (3) A series of postgraduate lectures in Medicine, Surgery, Obstetrics and Gynaecology, and Pathology was held, designed mainly for Residents but open for doctors in practice. (4) A new course in Nuclear Medicine was offered during the session. Admission was limited and eighteen candidates met the admission requirements. This proved to be a useful course and consideration will be given to expanding it.

Perhaps a significant indication of the reputation of graduate training in Toronto has been the increasing number of enquiries from graduates abroad wishing to take their graduate training here. This added substantially to the correspondence of the Division, for every effort had to be made to give as much help and advice as possible.

During the year the Division was glad to have the co-operation of several outside organizations in offering short postgraduate courses. A course at the Queensway General Hospital, organized by the Department of Paediatrics there, attracted a number of doctors interested in the Problems of the Adolescent. Members of our Faculty as well as of the Faculties at Ottawa and Queen's assisted in the teaching. The annual course in Fractures and Associated Trauma was offered with the co-operation of the Workmen's Compensation Board of Ontario. The programme was organized by the Orthopaedic Division of the Department of Surgery and the help of distinguished teachers from Europe and the United States was enlisted. This was a most interesting and successful co-operative effort in which the advice and facilities of the Workmen's Compensation Board were of tremendous assistance and contributed substantially to the attendance of 274 practising doctors who have a major interest in fractures and trauma.

DIVISION OF REHABILITATION MEDICINE

Under the direction of Professor A. T. Jousse

An active year of endeavour was punctuated in November, 1966, by a change in the site of operation. Just prior to the demolition of the old engineering building, a move to new quarters became necessary. During the early autumn the maximum endeavour of our University colleagues responsible for buildings and maintenance was directed toward the goal of renovating part of the building once known as the Ingram and Bell Building in order that it might be made suitable for occupancy by the Physical and Occupational Therapy students. The work was carried forward with dispatch. Only two weeks of lectures and demonstrations were lost. The instruction programme did not suffer as is borne out by the final achievement of the students.

The new quarters are the best yet available, although space is not sufficient. As a result, part of the teaching programme must be conducted in the Zion Church building at the corner of College and Elizabeth streets. This includes the teaching programme for Speech Pathology and Audiology.

The total number of Physical and Occupational Therapy students who were enrolled was 280. Of this number 83 graduated at the spring convocation.

Four Physical Therapists were enrolled in the course leading to a teacher's certificate, one in the final year and three in the first of the two-year programme. One graduated at the Spring convocation and will assume a position on the teaching staff in Physical Therapy.

A candidate for the teacher's course in Occupational Therapy was also enrolled last September and now has put in one year of work toward her certificate.

There have been many staff changes. Four have resigned. Miss Helen LeVesconte, who for many years has headed the teaching staff in Occupational Therapy, has retired. Her contribution over many years has been outstanding and the degree of appreciation of her colleagues and contemporaries has been revealed by the many receptions, dinners, and teas put on in her honour, each of which was accompanied by a presentation. The many friends of Miss LeVesconte wish her a very happy retirement.

Miss Lilian Pollard has also retired from the senior teaching post in Physical Therapy—one she has held since mid-way through World War II. Not only has Miss Pollard developed the programme in Physical Therapy to a high level of excellence, but she has been largely responsible for the training of the teachers of Physical Therapy who are now occupying the senior positions in five of the ten teaching programmes for Physical Therapy in Canada. She too has been fêted by friends, colleagues and students and has been the recipient of good wishes and tangible gifts and mementos, all of which attest to the esteem in which she is held.

Mr. Roy Walmsley resigned to assume the teaching post in Physical Therapy at Queen's University in Kingston after one year in Toronto. We wish him every success in this new and important post.

Miss Barbara Brown, a teacher in Speech Pathology and Audiology, resigned in March because of ill health. Her position could not then be filled. The remaining two members of the teaching staff without complaint filled the gap, and completed the year most successfully.

Miss Isobel Robinson, B.A., was promoted to assume Miss LeVesconte's mantle. Mrs. Sheila Irvine has joined the staff to assume the teaching responsibilities relinquished by Miss Robinson. Miss Ruth Bradshaw, B.Sc.(P&OT), has come from Edmonton to replace Miss Pollard. Miss Eunice J. Cook will come from Great Britain to replace Mr. Walmsley. Mrs. Jobbitt will fill a position which has been vacant for some time.

We have been most fortunate to obtain competent personnel by way of replacement. Our search for staff took us as far afield as Ceylon.

The Department of Rehabilitation Medicine in the Toronto Western Hospital has made two appointments. Dr. W. M. Franks joined the staff in July, 1966; and Miss Joan Peppiatt was appointed Charge Physical Therapist on April 1, 1967.

Research

A research project is being carried out at the present time at Lyndhurst Lodge Hospital. The research consists of a study of the mortality of the spinal cord injury patients who have been treated at the Lodge. The method consists of circulating a questionnaire together with an individual follow-up of each case not responding to the questionnaire. In this fashion the mortality rate and cause of death, survival time, age at death, and type of injury may be determined and correlated.

The study is being assisted by the Medical Department of the Manufacturer's Life Insurance Co. This is the second such study conducted in the last decade.

At the Toronto Western Hospital, Dr. W. Franks is conducting the investigation of neurological defects in rheumatoid hands.

Also at the Toronto Western, Dr. R. Renaud is conducting the second five-year survey of the treatment of amputees in the elderly population, and continuing the investigation of post-prostatectomy incontinence.

Honours

Mrs. Thelma Cardwell was elected President-Elect of the World Federation of Occupational Therapists at the Fourth International Congress in London, England, July, 1966.

Mrs. Thelma Cardwell was elected President of the Canadian Association of Occupational Therapists in October, 1966.

At the Convocation at Queen's University, Kingston, on May 26, 1967, the degree of Doctor of Laws (honoris causa) was conferred on Dr. A. T. Jousse. He then delivered the convocation address to the graduating classes in Medicine, Law, and Nursing.

Dr. C. M. Godfrey has been elected Chairman of the Museum Committee of the Academy of Medicine; President of the Canadian Association of Physical Medicine and Rehabilitation; President of the Physical Medicine and Rehabilitation section of the Ontario Medical Association; and Secretary of the North American Academy of Manipulation Medicine.

Scholarly Addresses

Dr. A. T. Jousse delivered the following addresses: *Tuesday, April 25*, at the F. G. Strong Rehabilitation Centre, Vancouver, (1) "Pain in Paraplegia" and (2) "Late Causes of Death and Life Expectancy in Paraplegia"; *Thursday, April 27*, at University Hospital, University of Washington, Department of Physical Medicine and Rehabilitation, "Early Management of the Patient with Trauma to the Spinal Cord"; *Friday, April 28*, Northwest Association of Physical Medicine and Rehabilitation at the Sheraton Motor Inn, Portland, Oregon, "Progressive Myelopathy as a Sequel to Traumatic Paraplegia" and "Vocational Re-establishment of Patients with Spinal Cord Injury."

Dr. J. S. Crawford participated in the following Refresher Courses for the Postgraduate Division of Medical Education: Electromyography; Physiotherapy; Manipulation; Rehabilitation Nursing. Under the auspices of the Canadian Arthritis and Rheumatism Society, Dr. Crawford participated in a Clinical Day for the Sudbury Medical Society, Sudbury, Ontario; and a Refresher Course of Rehabilitation Paramedical Personnel, at the Ontario Hospital Association Building, Toronto.

Dr. C. M. Godfrey spent December, 1966, in Afghanistan lecturing on Rehabilitation with Care Medico.

Publications

Cairns, R. S. and Jousse, A. T. "Touch-Operated Selector Controls—TOSC" (*Medical Services Journal, Canada*, vol. 22, no. 7, July-Aug., 1966, pp. 714–18).

Geisler, W. O., Jousse, A. T. and Wynne-Jones, M. "Vocational Re-establishment of Patients with Spinal Cord Injury" (*Medical Services Journal, Canada*, vol. 22, no. 7, July-Aug., 1966, pp. 698–709).

Geisler, W. O., Wynne-Jones, M. and Jousse, A. T. "Early Management of the Patient with Trauma to the Spinal Cord" (*Medical Services Journal, Canada*, vol. 22, no. 7, July–Aug., 1966, pp. 512–22).

Vranic, M., Jousse, A. T. and Geisler, W. O. "The Influence of Chlorhexidine Irrigation on Bacterial Counts of Bladder Urine in Spinal Cord Disease" (*Medical Services Journal, Canada*, vol. 22, no. 7, July–Aug., 1966, pp. 534–7).

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MEDICAL SOCIETY

(September 1966 to June 1967)

Honorary President	Dean A. L. Chute
Honorary Secretary-Treasurer	Dr. J. C. Laidlaw
President	M. L. Schwartz
Vice-President	B. W. Hands
Treasurer	R. G. Isaac
Secretary	Miss S. N. Levinoff

From a student's point of view, the year 1966–1967 was a significant one. There is evolving in the University a concept of an expanded student role. The ability to transfer lecture content to the written page without interaction of the cerebral cortex is no longer considered to be adequate. Today's student is expected to thoughtfully evaluate not only his course material but also the media by which he receives it. He is expected to be cognizant of his culture and aware of the world. He is expected to be a responsible member of the community at large. The more or less conscious objectives of the 1966–1967 Medical Society were to create an environment suitable for the actualization of this concept. The success or failure of its programmes may be evaluated in terms of the extent to which these ends were achieved.

During the past year David Posen's Staff-Student Committee assumed a role of increased importance. The committee, formerly a mere vehicle for the transmission of grievances across the hyphen in its name, evolved a philosophy of education, federalist in character and systems-oriented. During the discussion of the new medical curriculum student representatives spoke for the first time in the Faculty Council.

The year also saw an expansion of the social consciousness of the Society. It sponsored a symposium for staff and students on "Medicine in Underdeveloped Countries." The evening was organized by Peter Carlen and featured informal speeches and a film about various areas of the world. It proved to be stimulating and inspiring. The Society also attempted to organize a social/cultural/medical exchange with the Laval medical students, but was unsuccessful in doing so.

An area where good rapport between the Dean's office and the Medical Society produced significant achievements was in the production of a new file of good summer jobs available for medical students, and the publication of these positions in a series of pamphlets distributed to the students. Peter Newman carried out this onerous and important work.

Bob Sorokolit, the Faculty representative to the Canadian Association of Medical Students and Internes, organized a business meeting of the Ontario Association of Medical Students and Internes. It was decided that in view of the fact that health services organization is provincial, a strong provincial organization of medical students and internes would be an effective bargaining agent in representing their interests. The name S.O.M.A. (Student Ontario Medical Association) was coined.

An expanded freshman orientation programme undertaken by Stuart MacLeod met with both success and failure. A weekend at the Hart House Caledon Farm was poorly attended by both freshman and students of the other academic years. On the other hand, an assembly of all students at Convocation Hall to hear the Dean unveil plans for the new medical building and curriculum, and to hear Dr. Steiner reassure the students that they were neither unwanted nor unloved, was well attended. Tours of the Medical Building, the Best and Banting Institutes, and the hospitals, given by senior students to groups of three and four freshmen, proved very popular and were successful in establishing some vertical communication in the Faculty, and in instilling a sense of belonging in the first premedical class.

The *University of Toronto Medical Journal*, edited by Ken Pritzker and Terry Picton, had a year of unprecedented excellence. In its five regular numbers it demonstrated a keen awareness of the current relevant issues in Medicine, and in its centennial number attained a breadth of vision remarkable in a student publication. The Webster Writing Prize, given by the Academy of Medicine of Toronto for the best

article, was revived this year. It was awarded to Paul Manley for his article, "A Holistic Concept of Medicine."

For another year medical students obstinately refused to be artistic or literary on an organized basis. However, the Arts and Letters Society carried on bravely under the chairmanship of Kathy Chambers.

The *Probe*, the Society's literary publication edited by two stalwart first-pre-medical students, Caroline DeMarco and Marg McWhirter, fared less well than the *Journal*. The girls approached the Medical Society and offered to edit a literary magazine after all hope of publishing had been lost. They organized an efficient technical staff and procured financial backing. However, the Somerset Maughams and the Dylan Thomas's of the Faculty stayed away. Despite the obstacles they produced an interesting magazine.

That other medium of expression, Daffydil, under Larry Grossman, was a very slick production of a very funny show. Appropriately it achieved the impossible: critical acclaim in the *Varsity*.

The Medical At-Home broke new ground this year in catering to the atavistic tastes of the Faculty. In addition to the usual "square" dance band, Vice-President Brian Hands hired an animal band which held forth in the dungeon at Casa Loma. A good time was had by all.

A revision of its outdated constitution was undertaken by the Medical Society in the past year. Richard Isaac, who also did a superb job as Treasurer, performed this lengthy task.

This year the Society was fortunate in having as its representatives to the SAC, John Carlisle and Shelly Wagner. Shelly Wagner assumed the Vice-Presidency of the Council. Next year as President of the Medical Society his imagination and energy will doubtless carry the Society to new heights.

At the Graduation Banquet the Medical Society gave Honour Awards to nine members of the graduating class for their contribution to the Faculty. The recipients of the awards were: Michael Bach, Graeme Barber, Jack Colman, Larry Grossman, Stu MacLeod, Don Niece, Terry Picton, Dave Posen, and Michael Schwartz. In addition Graeme Barber, Terry Picton, and Michael Schwartz were honoured by the SAC for their contribution to the life of the University as a whole.

Over-all, I believe that the 1966–1967 season was a successful one for the Medical Society. Responsible for this success were the members of the Assembly who approached their job with enthusiasm and good humour, and the new climate of mutual trust and co-operation which exists between staff and students. Indeed a distinction between the "staff" and the "students" is rapidly becoming a spurious one because of the wisdom and efforts of men committed to the new idea of the University. Five people who worked directly for the Society and who for me best personify the new spirit are Jack Colman, President of the graduating class, Dr. J. C. Laidlaw, Stuart MacLeod, David Posen, and Dr. J. W. Steiner. My deepest thanks to them.

MICHAEL SCHWARTZ

MEDICAL ATHLETIC ASSOCIATION

(September 1966 to June 1967)

President	B. R. Taylor
Vice-President	D J. Carll
Secretary-Treasurer	D. C. Mather
Quartermaster	R. L. A. Walker
YEAR REPRESENTATIVES	
IV Medical Year	J. J. Hurwitz
III Medical Year	W. M. Jong
II Medical Year	V. Ozolins
I Medical Year	R. J. Chisholm
II Premedical Year	M. F. Smith
I Premedical Year	D. E. Kayler

The athletes of the Faculty of Medicine proved themselves to be keen participants this year, as they formed more teams and recorded fewer defaults than in recent years. Our standing for the Reed Trophy was slightly improved over the previous year as a fourth place finish was accomplished.

Because of moderately good participation and an enthusiastic coach, the football team won two games, and narrowly missed winning two more, to complete an encouraging season.

The volleyball teams did not make the playoffs, but the one soccer team did enter the quarter-finals.

Other sports in which teams from Medicine earned playoff positions were rugger, lacrosse, and basketball. The "A" hockey team staged a surprising comeback in the latter part of the season, and barely missed the playoffs, whereas the first premedical team succeeded in making the quarter-finals. The squash team, very often a contender, lost to Trinity in the semi-finals after a good season. The Med. IV waterpolo team gained another Interfaculty championship, rounding out a tremendously successful career of this particular team. Congratulations and thanks must go to its members.

The annual golf day held in early fall was moderately successful, considering the winter-like day with high winds and near freezing temperatures. The Fates were against us, as the guest speaker, Dr. Tovee, was called away to perform an emergency operation.

Two high points of the year were strictly Medical Faculty events, namely the ski day and the awards banquet. The former, held on February 1 at Alpine Ski Club, was a tremendous success, as 143 skiers were in attendance on an occasionally damp but very enjoyable day. The awards banquet on March 7 was just as much of a success, with over 100 present to fill the Swiss Chalet Bar B Q. Speakers Dr. Charles Snelling, Dr. Bruce Tovee, and Dean Chute were well accepted by the noisy group, helping to create a humorous start for the new term. The highest individual award, the Athletic Stick, was awarded to Graeme Barber, who unfortunately was not able to be present, as he was swimming for the University of Toronto in western Canada. This is the kind of activity which helped Graeme win the Athletic Stick as well as the top University of Toronto athlete award for 1966–67. The Tom Boeschenstein Award was presented to Paul Kent for 1966 and to Dave Carll for 1965. Executive keys, representative of participation in the administrative aspects of medical athletics, were awarded to Steve Richie and Jeff Hurwitz. Fifteen special awards and thirty athletic letters were given to the deserving representatives of the Faculty. Sincere thanks must go to all those who contributed to the organization of teams, and to the activities of those teams.

Bob Walker, the accomplished quartermaster over the last two years, was acclaimed the President of the Medical Athletic Association for 1967–68, and to him go my best wishes.

BRYCE TAYLOR

MEDICAL WOMEN'S UNDERGRADUATE ASSOCIATION

(September 1966 to June 1967)

Honorary President	Dr. Helen Evans Reid Chute
President	Christine M. Petyk Derzko
First Vice-President	Mary Bedford-Jones
Second Vice-President	Elizabeth McLean
Treasurer	Barbara H. Kawa
Secretary	Gail Porter

This year the M.W.U.A. executive was already busy working on their first major project, the Big Sisters–Little Sisters Programme, during the summer months. A circular was sent out to all Medswomen asking for volunteers to act as big sisters. As

soon as class lists were available, a personal letter was sent to each new girl entering the Faculty, congratulating her on her acceptance and giving a short résumé of the M.W.U.A. She was also contacted by the big sister assigned to her. All were entertained at a pizza party held on a Sunday afternoon early in September, in the Toronto General Hospital Students' Lounge. The party provided an excellent opportunity for the new Medswomen to meet girls in all years. We were pleased that our Honorary President, Dr. Reid, found it possible to attend. For most of us, this was our first chance to get to know her, and we sat fascinated as she told of her part in the Easter Island Expedition, and of her visit to Australia, New Zealand, and India. More than seventy Medswomen attended, and all enjoyed themselves thoroughly.

Shortly after the beginning of the fall term, the M.W.U.A. executive started working on a newsletter, which was to be distributed to all Medswomen. Three such newsletters were printed. The purpose was twofold: (i) to acquaint the members with the M.W.U.A.—its organization, its purposes, and its finances; its status in the Faculty, and its relationship with the Medical Women's Federation and the Medical Alumni Association, Women's Division—all as defined in the constitution; (ii) to provide a means of communication between the M.W.U.S. executive and its members.

The annual initiation banquet, co-sponsored by the Federation of Medical Women and the M.W.U.A., was held in mid-November in Burton Hall. The delicious supper was followed by Dr. Henrietta Banting's talk on the International Congress of Medical Women held in the United States and in Canada last summer. The turnout of women doctors and of Medswomen was excellent.

Our thoughts were focused on Christmas earlier than might be expected, for in the latter half of November, the traditional drive for Christmas gifts for children of the University Settlement House was held. This was followed in early December by our annual Christmas party. Second Premeds provided us with a catered supper, served buffet style, and the Third Meds girls provided very amusing entertainment.

In the first week of the third term, the Women's Division of the Medical Alumni Association sponsored a supper party for us. We had requested a speaker who would talk to us about L.S.D. We were indeed honoured and pleased to have Dr. Gordon Bell, Director of the Bell Clinic, as the speaker; his topic, Drug Addiction and L.S.D. Judging from enthusiasm and the size of the crowd which attended, we felt that this was one of the most successful events held.

Our final social event of the year was a wine and cheese party, given by the girls of the third medical year in honour of the graduating class. Dr. Reid graciously offered her home for this party. At this time the traditional silver teaspoons were presented to the graduates by the newly elected President of the M.W.U.A. for 1967–68.

In closing, I should like to thank the Medical Women's Federation and the Women's Division of the Medical Alumni Association for their interest in us, and particularly for the excellent evening each provided for us. Secondly, our Honorary President, Dr. Helen Evans Reid Chute, deserves a special note of thanks. She has been an excellent adviser and a most genial hostess. Finally I should like to express my gratitude to the members of this year's M.W.U.A. executive, for without their willingness and hard work nothing could have been done. To the incoming President and her executive, I extend, most sincerely, my best wishes for a very successful and enjoyable year.

CHRISTINE M. PETYK DERZKO

MEDICAL WOMEN'S ATHLETIC ASSOCIATION

(September 1966 to June 1967)

President	Gail Ponting
Vice-President	Patricia Blachford
Treasurer	Gail Porter
Secretary	Violet Shadd

During the 1966–67 academic year women of the M.W.A.A. represented the Faculty of Medicine within the intramural league of the Women's Athletic Association of the University in many diversified areas. Among the sports in which the M.W.A.A. participated were swimming, basketball, ice hockey, volleyball, and badminton. Although none of our teams even came close to taking top honours in any of these events, the players continued to thoroughly enjoy themselves this year, as in past years.

The highlight, and also the termination of the athletic season, was our annual banquet held on March 13 at the Nanking Restaurant. The M.W.A.A. awarded a Premeds Crest to Violet Shadd and a Medical "M" to Pat Blachford. The W.A.A. awarded a Citation to the Intercollegiate "T" to Violet Shadd and an Interfaculty "T" to Elizabeth McLean. Following the presentations the evening was concluded with a movie on the philosophy of sport made by the National Film Board called "Of Men and Sport."

I would like to thank all team coaches, managers, representatives, and players for their enthusiastic support throughout the year, and also to wish the incoming executive every success.

GAIL PONTING

BIOLOGICAL AND MEDICAL DIVISION UNIVERSITY LIBRARY

Reported by P. Steckl

The operation of the Division can be broken down into two major sections, the acquisition of new material and making the material available to interested parties.

Five years ago, at the urging of the Medical Library Committee, the Division initiated a systematic extension of the subscription list; a further 144 titles were added this year. On July 1, 1966, the Library initiated a new purchasing procedure whereby a copy of all commercially published books meeting certain requirements is received on approval. These dealer selection orders are, of course, supplemented by further purchases initiated by members of the teaching and library staffs. In all, 3,397 monographs in the bio-medical sciences were added to the Main Library's collection.

The use of the collection seems to increase as the book stack grows. While statistics do not tell the entire story, it might be worth noting that 54,562 items were borrowed from the Biological and Medical Division over the last twelve months, an increase of 14 per cent over the previous year. This figure includes 9,075 volumes sent via the Library's book delivery service to medical research staff and 5,763 volumes lent to teaching hospitals.

We wish to take this opportunity to thank the Medical Faculty for its close co-operation and support of the Library, evidenced both in daily contacts and in the meetings of the Medical Library Committee. Their valuable comments concerning both the purchase of new materials and the improvement of the service are always welcome.

REPORT ON REGISTRATION, SESSION 1967–1968

First Premedical Year	136
Second Premedical Year	131
First Medical Year	167
Second Medical Year	176
Third Medical Year	172
Fourth Medical Year	179
Special Student	1
Art as Applied to Medicine	13
Bachelor of Science (Medicine) (also registered in undergraduate medical years)	4
Bachelor of Science (Medicine) Summer Session	15

Diploma in Medical Radiology	40
Diploma in Psychiatry	39
Diploma in Anaesthesia	26
Other Graduate Students (Residents and Fellows)	557
Physical and Occupational Therapy	312
Speech Pathology and Audiology	22
Student Teachers	5
	1,995

FELLOWSHIPS, SCHOLARSHIPS, MEDALS AND PRIZES

Awarded at Convocation, 1967

Graduate

Ursula Bangs I.O.D.E. Scholarship	R. T. Manktelow, B.A., M.D.
Graham Campbell Prize	H. O. Barber, M.D., F.R.C.S.(C)
W. P. Caven Memorial Fellowship	Mrs. P. D. Glaister, B.Sc., Ph.D.
William Goldie Prize	J. H. Crookston, M.D., Ph. D.
Stuart Alan Hoffman Memorial Prize	J. E. M. St. Rose, Ph.D.
Arch. Hutchison Fellowship	A. N. Akin, M.D.
Frances Esther Hutchison Fellowship	D. R. M. McCourtie, M.D.
Alexander McPhedran Research Fellowship	D. R. M. McCourtie, M.D.
Minister of Health Gold Medal	S. A. Dziurdzy, M.D.
John Alexander Stewart Fellowships	A. N. Akin, M.D. R. A. Hart, M.D. D. R. M. McCourtie, M.D.

Undergraduate

Fourth Medical Year

Cody Gold Medal	M. Bach
Cody Silver Medal	S. Berger
Cody Silver Medal	R. I. Hilliard
Dr. Benjamin W. Appleton Prize in Psychiatry	A. H. Gladman
Butterworth Prize	D. S. Palframan
J. P. Boley Prize in Ophthalmology	S. O. Pugsley
Irving Heward Cameron Undergraduate Scholarship	R. I. Hilliard
Chappell Prize in Clinical Surgery	R. C. Strickler
Dr. Jacob Goldstein Scholarship	M. Bach
Issei Scholarship in Medicine and Surgery	S. Katz
Dr. Louis Kagan Memorial Award	S. O. Pugsley
Medal of the Consul General of France	M. L. Schwartz
Medical Alumni Association Scholarship	Miss M. L. Trenholme
Ellen Mickle Fellowship	M. Bach
Ontario Medical Association Prize in Preventive Medicine	S. Berger
Dr. Roy Simpson Scholarship in Paediatrics	M. Bach
Starkman Memorial Scholarship in Medicine	R. I. Hilliard

Third Medical Year

Class of Medicine 1924 War Service Scholarship	R. M. Shier
Dr. F. J. Colling Memorial Scholarship (renewal)	G. R. French
Franckel Memorial Award	P. F. Halloran
Charles E. Frosst Scholarship	A. D. Tepperman
J. F. Hartz Company Prize in Ophthalmology	Miss M. E. Bradley
J. F. Hartz Company Prize in Oto-Laryngology	M. J. Bass
Frank W. Horner Gold Medal	P. R. Newman
Dr. Mitchell Kohan Scholarship	P. F. Halloran
Saddington Medal in Pathology	P. F. Halloran
Starkman Memorial Prize in Pharmacology and Therapeutics	H. Vellend
Starkman Memorial Scholarship in Preventive Medicine	S. E. Shulman
Samuel J. Streight, O.B.E., M.D., Scholarship in Internal Medicine	W. K. Laird
Dr. C. S. Wainwright Memorial Scholarship (renewal)	B. N. French
Walter F. Watkins Scholarship	H. Vellend

Second Medical Year

Dr. F. J. Colling Memorial Scholarship	J. S. Keystone
John Copp Bursary	J. R. Pampe
William Edward Corlett Memorial Scholarship (renewal)	N. D. Berman
Posluns Brothers Scholarship	A. J. Shoichet
Sandoz Prize in Pharmacology	A. J. Shoichet
Dr. C. S. Wainwright Memorial Scholarship (renewal)	A. J. Shoichet
Major William McLean Walwyn Award (renewal)	D. F. Symons
Walter F. Watkins Scholarship	J. M. Dawson

First Medical Year

Dr. and Mrs. M. A. Pollock Award	H. Grosman
Dr. Thomas Arnold McCormick Scholarship	L. D. Gardner
Starkman Memorial Scholarship in Anatomy	Miss N. H. McKee
Dr. C. S. Wainwright Memorial Scholarship	Miss N. H. McKee
Walter F. Watkins Scholarship	S. Greenberg, D. M. Newman } Aeq.
John Zoberman Scholarship	Miss N. H. McKee

Second Premedical Year

Famous Players Canadian Corporation Scholarship	Miss S. Chu, S. Silverberg } Aeq.
Fulford Scholarship (No. 4 General Hospital)	S. Silverberg

ANAESTHESIA

Under the direction of Professor R. A. Gordon

The winds of change blowing through the Faculty have accelerated the process of critical examination and planning which has characterized the academic programme of this Department over the past several years. During the early months of the session, it was evident that the Department was pervaded by a sense of uneasiness concerning projected changes in curriculum and teaching commitment, but as the session advanced, this has been largely dispelled as communication within the Faculty and within the Department has improved understanding of the developments in prospect over the coming years.

The teaching of undergraduate students in the third and fourth years has continued in the pattern established during the past several sessions. Emphasis in the undergraduate course is placed on resuscitation, maintenance of the airway, ventilation and general care of the unconscious patient. Each senior student is attached for one week during the surgical term to an instructor who acts as preceptor. The fourth year students have also been given a series of weekly two-hour clinics during the surgical term, and have been required to show an elementary proficiency in certain technical procedures essential to the contemporary general physician. The time allotted to the Department for this teaching continues to be most inadequate, and there is no doubt that in the present curriculum the peculiar talents of the anaesthesiologist have not been employed to the best advantage in the undergraduate programme.

There were fifty-two postgraduate students in the Department during the year, thirty-three of whom were registered in the Diploma Course, the remainder being sessional students. The number of appointments available for residents and fellows in the teaching hospitals has again been increased to meet the growing demand for training in the specialty of anaesthesia.

The Teaching Committee of the Department has carried out an intensive study of the present programmes of undergraduate and postgraduate instruction, and it is

anticipated that the findings and recommendations of this Committee will result in sweeping changes in our teaching methods.

The Diploma in Anaesthesia of the University of Toronto was awarded to: Dr. G. D. Blenkarn, Dr. J. S. Burger, Dr. P. Heyland, Dr. Metta Piyapongse, and Dr. G. Sellery. Two candidates were unsuccessful in the examination.

The Department gave a one-week refresher course for specialists in anaesthesia in October, 1966. Members of the Department have contributed to a number of post-graduate courses in other departments of the Faculty.

The Eighth Dr. Harry Shields Lecture was given on October 28, 1966, by Professor F. H. VanBergen of the University of Minnesota. Professor VanBergen's subject was "The Mechanical Lung Ventilator as Another Black Box."

Dr. Lucien Morris of Seattle was a Visiting Professor in the department from March 13 to March 16, 1967, and addressed a special staff meeting of the Women's College Hospital on the subject of "The Role of the Anaesthetist in the Post-operative Period."

The Department has been pleased to welcome a number of distinguished visitors during the year, amongst them the following: Dr. Margaret McClelland of the Royal Children's Hospital, Melbourne, Australia; Dr. Mary Burnell, North Adelaide, South Australia; Dr. Herbert H. Pinkerton, Western Infirmary, Glasgow; Dr. J. H. Sando, Adelaide, South Australia; Dr. Lucien Morris, Seattle, Washington; Dr. Samuel A. Oduntan, University of Ibadan, Nigeria; Dr. Alvar Swenson, Karolinska Children's Hospital, Stockholm.

Dr. Joseph A. Vining has resigned his appointment as Anaesthetist-in-Chief at St. Michael's Hospital, and remains on the staff of the Department as a part-time Assistant Professor attached to the staff at St. Michael's Hospital. Dr. J. R. Vanderberg has joined the Department as a Clinical Assistant on the staff of St. Michael's Hospital. Dr. Michael Krestow joined the Department as a Clinical Assistant at the Toronto Western Hospital, and Dr. Kirk Weber has been Teaching Fellow and Clinical Assistant at the Toronto General Hospital.

Dr. Shirley Fleming has continued for a fifth year as Professor and Head of the Department of Anaesthesia of the University of Lagos Medical School in Nigeria. Dr. Raymond Matthews has also been serving in that Department since February 1, 1967. Professor Vidal Fowler of the University of Lagos Medical School has been attached to the Department and has been working in the teaching hospitals of this University from January 1 to June 30, 1967. The Department continues to sponsor a programme of assistance to the Lagos School, with the financial assistance of the Educational Division of the External Aid Office of the Government of Canada.

Professor R. A. Gordon was Visiting Professor at the University of Lagos Medical School during the first three weeks of February, 1967. During his visit he took part in the teaching programme at both the undergraduate and postgraduate level. Professor Gordon was Visiting Professor at Queen's University during October, 1966, and at the University of British Columbia in March, 1967. In August, 1966, Professor Gordon attended the executive sessions of the World Federation of Societies of Anaesthesiologists in Copenhagen, Denmark, and was in attendance at the meeting of the Association of University Anaesthetists of the United States of America in New York in March and the Annual Conference of Heads of Departments of Anaesthesia of Canadian Universities in Montreal on June 25, 1967.

Dr. Alan Conn has served as Chairman of the Joint Committee on Inhalation Therapy of the Canadian Medical Association and the Canadian Anaesthetists Society, and has been active in the development of curriculum and schools for the training of inhalation therapy technicians. Dr. Iain MacKay has continued to act as Chairman of the Metropolitan Toronto Hospital Council Committee on Disaster Planning, and as representative of the Canadian Medical Association on the Emergency Health Services Special Advisory Committee to the Minister of National Health and Welfare. Dr. MacKay has also been appointed Area Surgeon for the Central Ontario Area of St. John's Ambulance Society.

Scholarly Addresses

The following scholarly addresses were given by members of the Department during the year.

Professor R. A. Gordon to the Medical Staff of the Lagos University Teaching Hospital, "Complications of Anaesthesia and Surgery Related to Position of the Patient," February, 1967; to the Department of Ophthalmology, University of British Columbia, "Problems with Anaesthesia Related to Ophthalmological Surgery," and to the Department of Anaesthesia, University of British Columbia, "Physiological Principles of Mechanical Ventilation," "Complications of Anaesthesia Associated with Position of the Patient," and "Present Status of the Halothane—Liver Controversy" in March, 1967; to the Washington State Society of Anesthesiologists, "The Present Status of the Halothane-Liver Controversy," March, 1967.

Professor H. B. Fairley to the Conference on Respiratory Therapy, Boston, Massachusetts, October, 1966, "The Organization of a Respiratory Failure Unit"; to the Scarborough Medical Society, "The Application of Hyperbaric Oxygen Therapy in Clinical Practice"; to the Hamilton Anaesthetists' Society, "Respiration in the Post-operative Period"; to the Department of Anaesthesia, Harvard University, "Physiological Changes Arising from Chest Wall Injury"; to the Department of Neurology, Jefferson Medical School, "Respiratory Failure in the Neurological Patient"; at the Center for Continuing Education, University of Minnesota, "Respiration in the Post-operative Period" and "The Central Venous Pressure Line—Useful or Misleading?"; at the Center for Continuing Education, Cleveland Clinic, Cleveland, Ohio, "The Mechanical Ventilator—Uses and Abuses" and "Respiration in the Immediate Post-operative Period."

Dr. David Evans to the Academy of Medicine, Toronto, "Report of Work in Progress in a Study of Myocardial Function During Haemmorhagic Shock in Dogs."

Dr. C. P. Crompton to the Section of Anaesthesia of the Ontario Medical Association, "Epidural Cortisone in the Treatment of Low Back Pain."

Dr. W. Jones to the Section of Anaesthesia of the Ontario Medical Association, "Intravenous Supplemental Anaesthesia for Intra-ocular Surgery."

Dr. A. W. Conn to the Inhalation Therapy Seminar, McGill University, Montreal, April, 1967, "Asthma"; to the Michigan State Society of Anesthesiologists, May, 1967, "Hyperpyrexia in the Operating Room."

Dr. Donald C. Finlayson in a contribution to a panel discussion on "Shock—Evaluation and Management," at St. Michael's Hospital.

Research

Professor Fairley has continued his researches in respiratory physiology as applied to anaesthesia and respiratory failure. In conjunction with Dr. A. K. Laws, Dr. J. H. Kerr, and Dr. G. R. Sellery, he has completed a study of factors influencing immediate post-operative arterial oxygen tension. In conjunction with Dr. Ramachandran, Dr. Fairley has studied the usefulness of blood samples taken from a central venous pressure line in the assessment of acid base balance and oxygenation during the management of respiratory failure. With the assistance of Dr. R. Frew, Professor Fairley had made an evaluation of respiratory changes during the week following upper abdominal surgery, and their modification by the use of a disposable rebreather.

At St. Michael's Hospital, Dr. D. C. Finlayson has continued his studies of red-cell mass and plasma volume changes under several circumstances associated with spinal anaesthesia and trans-urethral surgery. Dr. Finlayson has also initiated hemodynamic and metabolic studies for the purpose of evaluating some of the pathophysiological defects and treatment protocols in several types of shock, and has commenced a study for the evaluation of the use of lignocaine for differential spinal anaesthesia in the study of pain in the lower back and lower extremity.

At the Hospital for Sick Children, Dr. A. W. Conn, with the assistance of Dr.

M. G. Viguera, has investigated the occurrence of hyperpyrexia in relation to general anaesthesia, using chickens as the experimental animal.

At the Toronto Western Hospital, Dr. David Evans has commenced a study of myocardial function during haemorrhagic shock in dogs. At the same hospital, Dr. Evans has also made a special study of anaesthesia for patients with constrictive pericarditis; Dr. Williams Jones has developed a technique of anaesthesia for intraocular surgery based on supplementation of light inhalation anaesthesia by intravenous increments of meperadine: Dr. C. P. Crompton has evaluated the usefulness of epidural cortisone therapy for low back pain, and Dr. H. W. Boyes and Dr. J. M. R. Campbell have been studying anaesthetic problems related to renal transplantation.

Dr. B. M. Marshall has been associated with Dr. William Lougheed of the Department of Neurosurgery in an investigation into the causes and methods of the control of vascular spasm occurring in association with ruptured intracranial aneurysms.

Dr. Beverley Britt in association with Professor Werner Kalow of the Department of Pharmacology has engaged in a study of cellular responses involved in drug-induced hyperthermia and cellular necrosis. Dr. Britt has been supported by an Anna Bradbury Springer Fellowship, Department of Postgraduate Medical Education, and by the Burroughs-Wellcome Award for Research in Anaesthesia.

Publications

Brown, D., Johnston, A. E. and Conn, A. W. "Respiratory Insufficiency and its Treatment following Cardiovascular Surgery" (*Canadian Anaesthetists' Society Journal*, vol. 13, no. 4, July, 1966, pp. 342–60).

Fairley, H. B. "The Effect of Hyperventilation on the Arterial Oxygen Tension: A Theoretical Analysis" (*Canadian Anaesthetists' Society Journal*, vol. 14, no. 2, March, 1967, pp. 87–93).

Fairley, H. B. and Sellery, G. R. "The Inspired Oxygen Concentration delivered by the Bird Ventilator" (*Anesthesiology*, vol. 28, no. 2, March–April, 1967, pp. 453–7).

Gebbie, D. M. and Finlayson, D. C. "Use of Alpha and Beta Adrenergic Blocking Drugs and Halothane in the Anaesthetic Management of Phaeochromocytoma" (*Canadian Anaesthetists' Society Journal*, vol. 14, no. 1, Jan., 1967, pp. 39–43).

Gordon, R. A. (ed.) *Anaesthesia and Resuscitation: A Manual for Medical Students*. Toronto: University of Toronto Press. June, 1967. Pp. 179.

Relton, J. E. S., Creighton, R. E., Conn, A. W. and Nabeta, S. "Generalised Muscular Hypertonicity associated with General Anaesthesia: A Suggested Anaesthetic Management" (*Canadian Anaesthetists' Society Journal*, vol. 14, no. 1, Jan., 1967, pp. 22–5).

Relton, J. E. S., Creighton, R. E., Johnston, A. E., Pelton, D. A. and Conn, A. W. "Hyperpyrexia in Association with General Anaesthesia in Children" (*Canadian Anaesthetists' Society Journal*, vol. 13, no. 5, Sept., 1966, pp. 419–24).

Steward, D. J., Baker, C. B. and Finlayson, D. C. "Recurrent Ventricular Fibrillation Treated by Multiple Countershocks" (*Canadian Medical Association Journal*, vol. 95, no. 4, July 23, 1966, pp. 164–5).

Viguera, M. G. and Conn, A. W. "An Investigation of General Anaesthesia and Hyperpyrexia in Chickens" (*Canadian Anaesthetists' Society Journal*, vol. 14, no. 3, May, 1967, pp. 193–6).

ANATOMY

Under the direction of Professor J. S. Thompson

Teaching

The Department of Anatomy continues to carry a very heavy load of undergraduate, graduate, and postgraduate teaching. The thirteen members of the teaching staff were responsible for the courses listed below. Fortunately we were able to obtain the assistance of an able group of full-time demonstrators who made possible a reasonable level of individual instruction to our various groups of students. Many of

the courses listed are tailored to the needs of individual groups and, unfortunately, cannot be combined with others, to lighten course loads on individual instructors.

Undergraduate Teaching

Gross Anatomy

36	Biology and Medicine students, second year
29	Biology and Medicine students, third year
125	Dentistry students, first year
48	Dental Hygiene students, first year
165	Medical students, first year
5	Art as Applied to Medicine students, first year
4	Rehabilitation Medicine Teachers' Course students
110	Rehabilitation Medicine students, first year
92	Rehabilitation Medicine students, second year
83	Rehabilitation Medicine students, third year
14	Speech Pathology and Audiology students
91	Physical and Health Education students, second year
73	Physical and Health Education students, third year

Histology

34	Biology and Medicine students, third year
165	Medical students, first year
5	Art as Applied to Medicine students, first year
110	Rehabilitation Medicine students, first year

Neuroanatomy

125	Dental students, first year
179	Medical students, second year
14	Speech Pathology and Audiology students
1	Art as Applied to Medicine student, second year

Graduate Teaching

This section of the teaching divides itself naturally into two parts: formal courses to graduate students, and the supervision of graduates proceeding to advanced degrees.

Formal Graduate Courses

3	Gross Anatomy
14	Histology
20	Growth Constitution and Evolution
4	Human Neuroanatomy

One student was registered for the Ph.D. programme in the past year and three students were registered for the programme leading to the M.Sc. degree. One of the latter will receive her M.Sc. this spring and it is expected the other two will receive theirs this fall.

Postgraduate Teaching

Special courses were given to several groups of students who are not proceeding to advanced degrees but who are working towards special diplomas or recognition as specialists by national bodies. These courses, most of which were given under the auspices of the Division of Post-graduate Medical Education of the Faculty of Medicine, are as follows:

18	Physiotherapy students
18	Dental Anatomy students
6	Surgery students
19	Radiology students
15	Anaesthesia students
20	Neuroanatomy students
5	Ophthalmology students
10	Otolaryngology students
36	Surgery students (advanced course)
16	Obstetrics and Gynaecology students (advanced course)
14	Obstetrics and Gynaecology students

In addition to the foregoing graduates two were registered in the Department for the B.Sc.(Med.) degree. One of these will obtain his degree at the spring convocation.

We wish to record our appreciation of the assistance given to our teaching effort by practitioners and others in other university departments and institutes. Not only was their interest greatly appreciated but they brought to our students their own special skills and attitudes and provided a healthy atmosphere of inter-departmental co-operation.

We were most fortunate when two new members joined our staff in the summer of 1966. Dr. A. A. Axelrad is now Professor and Head of the Division of Histology and Dr. D. H. Cormack is Assistant Professor (Histology). Both men bring to the Department of Anatomy keen enquiring minds which have already stimulated both teaching and our research effort.

Dr. A. W. Ham resigned as Chairman of the Department at the end of June, 1966, and, while he continues on the teaching staff, his wise leadership was sorely missed.

We are pleased to report that Dr. E. G. Bertram will be joining the staff as Professor (Gross Anatomy and Neuroanatomy) in the summer of 1967.

Certain rooms in the Anatomy Building have been redecorated and renovated to make them suitable as special research laboratories—these are already being fully used.

Distinguished visitors to the Department in 1966–67 included: Dr. J. C. Allan, Senior Lecturer in Anatomy, University of the Witwatersrand, Johannesburg; Dr. Harry Harris, Galton Professor of Human Genetics, University of London, United Kingdom; Dr. R. F. J. Withers, Department of Biology as Applied to Medicine, The Middlesex Hospital, Medical School, London W1; Dr. Graeme Schofield, Professor and Head of the Department of Anatomy, Monash University, Victoria, Australia; Dr. A. Mohiuddin, Professor and Head, Morphological Sciences Department, University of Lagos, Nigeria.

Scholarly Addresses

A. A. Axelrad (with the technical assistance of H. C. Van der Gaag): "Genetic Studies on Friend Virus Induction of Leukemic foci in the Spleen of Mice," 9th International Cancer Congress, Tokyo, page 41, 1966 (abstract).

D. H. Cormack: "Cell Surfaces," Invited Seminar, Department of Zoology, University of Toronto, November, 1966.

J. W. A. Duckworth: "Thomas Dover, Physician and Merchant Adventurer—1660–1742," Toronto Medical Historical Society, March, 1967.

A. G. Erwin: "Male Mammary Gland Tissue in Female Mice," American Association of Anatomists, Kansas City, Missouri, April, 1967.

J. S. Thompson (with Dr. M. W. Thompson): "Behaviour Genetics as Seen by Two Geneticists," Invited Seminar, Department of Psychology, University of Guelph.

J. S. Thompson: Invited Discussant, International Symposium on Physical Activity and Cardiovascular Health, Toronto.

Research

Dr. A. A. Axelrad and his associates are engaged in two research programmes. The first, carried on mainly at the Ontario Cancer Institute, is an analysis of the sequence of events which begins with the infection of susceptible mice by Friend leukemia virus and ends, a few days later, with massive spleen and liver enlargement and widespread dissemination of abnormal proliferating cells. Having devised a method whereby the quantities of Friend virus delivered to and recovered from tissues may be precisely measured, they have shown that susceptibility to leukemic

transformation and multiplication of the virus in the spleen is controlled at a single gene locus. More recently they have developed a method which permits the estimation of the number of neoplastic cells produced by infection with known quantities of the virus. In collaboration with Dr. D. L. McLeod, efforts are now being directed toward the isolation of the Friend virus-host cell system *in vitro*.

The second programme, which will be carried out mainly in the Department of Anatomy, is designed to detect and study that minority of cells in a variety of adult tissues which serve as the stem from which these tissues are normally renewed, or from which they regenerate after injury. The mechanisms by which these stem cells are suppressed or stimulated are still largely unknown.

Mrs. W. M. Brown has sought to characterize the normal cells in the spleen of the mouse that are transformed by Friend leukemia virus. Electron microscope studies on the spleen cells of C3H mice, infected with Friend virus, have been initiated in an attempt to evaluate early changes in these cells. At present the study involves examination of spleen tissue 1, 2, 4, 8, 12, and 24 hours after injection of the virus.

Dr. D. H. Cormack has investigated factors responsible for the adhesiveness of cells and ways in which this can be altered experimentally. He demonstrated the presence of a surface coat of acidic mucopolysaccharide on the cells of solid tumours and has shown that some sialic acid can be released by neuraminidase. He has provided evidence that sialic acid groups in the mucopolysaccharide may be involved in the initial attachment of free tumour cells to serous membranes. Wheat germ lipase was found to be bound at cell surfaces and to induce active pinocytosis while ribonuclease and protamine are bound at the surface of sea urchin eggs and inhibit cell division. Since reduced adhesiveness is a characteristic of malignant cells, these studies of surface properties have significance in the study of cancer.

Dr. J. W. A. Duckworth has studied the developing hearts of humans and hamsters. He, and a graduate student Miss P. Cunningham, have investigated the development of the conducting system of the hamster heart. He has also investigated the same system in humans. The embryology of transposition of the great vessels of the heart and of double outlet right ventricle in humans is also under study.

Dr. A. G. Erwin in collaboration with Dr. J. S. Thompson has studied the growth and development of mammary gland tissue of male mice of certain inbred strains when this tissue is transplanted into hybrid female mice. Donors have been from low and high mammary tumour strains; the growth of the glands and the development of pre-malignant hyperplastic nodules has been observed.

Dr. R. G. MacKenzie has studied the muscleature of the pharyngo-esophageal junction. He has directed two students studying for the degree of B.Sc. in Medicine in investigations involving the spinal nerves and the manner in which they leave the spinal cord, meninges, and vertebrae. This latter investigation is related to the severe pain often suffered by patients with problems associated with the spinal nerves.

Dr. K. O. McCuaig has continued to act as anthropologist-consultant to the Burlington Growth Center which is concerned with the study of the physical and mental growth and development of children. He has also studied variations and anomalies in North American Indian skulls. His interests have recently turned to research in methods of medical and dental education.

Dr. D. L. McLeod and his graduate student, A. Hui, have investigated the effect of phenylhydrazine-induced anaemias on the growth and development of newborn mice in an effort to determine whether some of the characteristics of runt disease are actually due to the anaemia which is a major component of this syndrome. Work to date indicates that many of the other characteristic features of runt disease can indeed be produced by phenylhydrazine-induced anaemias. With Dr. A. A. Axelrad he is starting an investigation into the transformation of hemopoietic cells, *in vitro*, by Friend virus.

Dr. C. G. Smith has studied the distribution of the nutrient arteries within the pons segment of the brain stem in an attempt to explain the preservation of the floor of the fourth ventricle when the paramedian vessels are occluded.

Dr. J. S. Thompson continued his studies on the genetic factors that control the patterns of the blood vessels and their normal variations. It appears that both genetic and environmental factors are involved and that the type of genetic control is different in different vessels. He has also been endeavouring to produce atherosclerosis in the blood vessels of inbred strains of mice and has, after some initial problems, determined that certain strains of mice can be maintained for many months on diets which, in rats, produce atherosclerosis.

Publications

Axelrad, A. A. "Genetic Control of Susceptibility to Friend Leukemia Virus in Mice: Studies with the Spleen Focus Assay Method" (*National Cancer Institute*, Monograph no. 22, 1966, pp. 619–29).

Duckworth, J. W. A. "Embryology of Congenital Heart Disease"; in *Heart Disease in Infancy and Childhood* (2nd ed.) by John D. Keith, Richard D. Rowe and Peter Vlad, pp. 136–58. New York: Macmillan. 1967.

Duckworth, J. W. A., Shaher, R. M., Khowny, G. H. and Moes, C. A. F. "The Significance of the Atrial Sinus on the Diagnosis of Positional Anomalies of the Heart" (*American Heart Journal*, vol. 73, no. 1, Jan., 1967, pp. 32–40).

Erwin, A. G. "Male Mammary Tissue in Female Mice" (*Anatomical Record*, vol. 157, no. 2, Feb., 1967, p. 241) (Abstract).

Smith, C. G. *Basic Neuroanatomy*. Toronto: University of Toronto Press. 1967. Pp. 257.

Thompson, J. S. "Discussion in Proceedings of the International Symposium of Physical Activity and Cardiovascular Health" (*Canadian Medical Association Journal*, vol. 96, no. 12, March 25, 1967, pp. 730–1).

——— Review, *Medical Post*, vol. 2, no. 18, Aug. 30, 1966, p. 12.

Thompson, J. S. and McLaughlin, P. "Impaired Pronation-Supination of the Forearm: an Inherited Condition" (*Anatomical Record*, vol. 157, no. 2, Feb., 1967, p. 333) (Abstract).

ART AS APPLIED TO MEDICINE

Under the direction of Professor N. Joy

The Senate has approved changes in the three-year course of Art as Applied to Medicine offered by the Faculty of Medicine, to include a course in English, to include History of Medicine as a compulsory rather than an optional subject, and to lead to a Bachelor of Science in Art as Applied to Medicine instead of a diploma. Candidates must meet the general University admission standard, which is Ontario Grade XIII with standing of at least 60 per cent in five subjects. English is compulsory. Students currently enrolled in the diploma course will be able to fulfill all the requirements of the degree course, and hence will be able to graduate with the degree. Students who already hold the diploma and who wish to re-enrol to complete subjects which would qualify them for the degree may apply to do so.

Field visits by staff and students this year included one to the Technifax Corporation to attend a seminar-workshop supervised by members of the Technifax staff, and another as guests of Mr. Harry Davis, Supervisor of T.V. and Mr. Riglehof, Art Director, at Scarborough College.

The Service Department has added two junior draftsmen-illustrators to its staff. The quantity of work continues to increase at the rate of approximately 25 per cent per annum. Four to five hundred graphs of varying complexity were prepared and also about 100 to 150 tables were typed or varityped for lecture slides.

Display work on a scale never before attempted by the Department has been possible because of the better space and facilities in the new Art as Applied to Medicine Department at 256 McCaul Street. A permanent display was prepared to show the progress of the building of the new Medical College, and a number of temporary displays were prepared for medical meetings including the Open House to celebrate the opening of the new quarters for the Department of Ophthalmology.

A brochure describing the activities of the Bio-Medical Electronics Institute and posters to advertise certain graduate courses have been designed.

Miss Margot Mackay joined the staff in the position of Lecturer. She and Mrs. Bridget Hough have been working on a set of surgical drawings which may develop into an atlas type of book. In addition, about 200 medical and surgical drawings, eye fundus pictures, and diagrams for inclusion in films have been prepared by members of the staff.

The Department held Open House and invited all members of the Faculty to see the work of staff and students at the end of March. Mr. Jorge Perez Vela, Medical Illustrator from Mexico City, visited the Department during the Open House week and lectured and demonstrated to students, AAM staff, and other members of the Faculty.

Miss Blackstock, Assistant Director, and Miss Margot Mackay attended the annual meeting of the Association of Medical Illustrators in Atlanta, Georgia in October, 1966.

BACTERIOLOGY

Under the direction of Professor Philip Greey

No major changes were made in the undergraduate teaching.

Dr. P. G. Tuffnell was appointed July 1, 1966, an Assistant Professor (part-time).

Dr. Ian Duncan has been appointed an Associate Professor (part-time), and will be Chief of Service, Bacteriology, at Sunnybrook Hospital commencing August 1, 1967.

Honours

Professor Philip Greey has accepted a fourth five-year appointment to the Expert Advisory Panel on Antibiotics of the World Health Organization.

Research

Dr. R. C. French has continued an investigation of the exclusion of carried lambda from *E. coli* Y10 (λ) by coliphage T4r$^+$. A report on the "physiology" of the exclusion process was published in the *Canadian Journal of Microbiology*. At present, methods for the production of adequate amounts of purified, isotopically labelled lambda and T4 DNA are being studied. The labelled DNA's will be used as substrates in studying the deoxyribonucleases produced during the exclusion process.

Dr. A. E. Franklin has continued a collaborative study with Dr. D. A. Gordon relating to the possible role of micro-organisms in the etiology of rheumatoid arthritis and viral plasmacytosis (Aleutian mink disease). Synovial fluids obtained from patients with classical rheumatoid arthritis have been studied for the presence of mycoplasma and transmissible agents, using special mycoplasma agar and tissue culture techniques. Although agents have been isolated from these specimens, it is not yet clear if there is a relationship with disease. An agent has been isolated from organ suspensions (liver, spleen, kidney) obtained from mink with confirmed viral plasmacytosis, using tissue cultures of baby hamster kidney. As soon as this experiment can be confirmed, tissue culture specimens will be inoculated to mink in attempts to reproduce the disease. An additional collaborative study with Dr. N. S. Taichman has related to the effect of vaccinia virus in the local Shwartzman reaction. This has been studied by histological techniques, lysosomal enzyme determinations, and electron microscopy. The role of other viruses in the Shwartzman phenomenon is currently under study.

Dr. Peter Tuffnell, Toronto General Hospital, is studying the absorption and excretion of a new tetracycline antibiotic.

Dr. G. H. Hawks, at St. Michael's Hospital, has continued a study on the presence of auto-antibodies in thyroid disease using the tanned red cell technique.

Dr. Peter Fleming, at the Hospital for Sick Children, is continuing a study of the cephalosporins and the purification of cephalosporinase. He is also determining the value of ampicillin in acute purulent meningitis.

Miss Joan Hennessy has continued attempts to isolate a viral agent from patients with cat scratch disease in further tissue culture cell lines. Transmissible cytopathogenic effects obtained after serial passages in two animal cell lines have been shown by electron microscopy to be caused by mycoplasma. Cell lines are being treated with combinations of antibiotics and heat in hopes of producing mycoplasma-free tissue culture cells and eliminating the false cytopathogenic effects.

Several methods of testing for R-factor in enteric bacilli have been investigated and many strains of *Salmonella* and *E. coli* checked for the presence of R-factor, or the ability to receive antibiotic resistance from other bacteria containing R-factor.

Supplies of teaching material needed for second year medical students' Bacteriology, especially stained smears and sections, are being expanded to meet future requirements.

Dr. J. C. Sinclair and his associate Miss Barbara K. Buchner, M.A., are continuing to study, by tissue culture methods, marmoset specimens from the experiments which Professor F. Deinhardt and Dr. A. W. Holmes of the Presbyterian–St. Luke's Hospital, Chicago, are conducting to determine if the marmoset may be of value as an experimental animal for the study of infectious hepatitis.

Publications

French, R. C. and Barrens, M. "The Exclusion of Intracellular Lambda from Escherichia Coli Y10 (λ) by T4r+ Coliphage" (*Canadian Journal of Microbiology*, vol. 12, no. 6, Dec., 1966, pp. 1197–1202).

Gordon, D. A., Franklin, A. E. and Karstad, L. "Viral Plasmacytosis (Aleutian Disease) of Mink Resembling Human Collagen Disease" (*Canadian Medical Association Journal*, vol. 96, no. 18, May 6, 1967, pp. 1245–51).

Gordon, D. A., Franklin, A. E., and Mustard, J. F. "Cellular Damage and Platelet Aggregation associated with Tissue Cultures Inoculated with Rheumatoid Arthritis Synovial Fluid" (*Arthritis and Rheumatism*, vol. 9, June, 1966, p. 508).

Greey, P. H. Review, *Modern Medicine of Canada*, vol. 21, no. 11, Nov., 1966, p. 139.

BIOCHEMISTRY

Under the direction of Professor G. E. Connell

During the year 581 students have received instruction in the Department of Biochemistry, the distribution being as follows:

Faculty of Medicine (first professional year)		159
Faculty of Dentistry (first professional year)		127
Faculty of Arts & Science (third year: Honours courses)		51
(fourth year: Honours courses)		51
Graduates enrolled as Special Students in Faculty of Arts & Science		32
Faculty of Food Sciences (third year)		15
(fourth year)		6
School of Graduate Studies		140
(*a*) Major subject Biochemistry	40	
Post-doctoral Fellows	2	
Candidates for Ph.D.	15	
Candidates for M.Sc.	23	
(*b*) From other departments	81	
(*c*) Special Students	19	
Total		581

Among the graduate students majoring in Biochemistry, 3 held fellowships of the Medical Research Council, 9 held scholarships of the National Research Council, and 8 held Province of Ontario Graduate fellowships; 23 graduate students were granted teaching fellowships by the Department.

The following students registered in the Department of Biochemistry completed work and presented theses for graduate degrees as follows:

Ph.D. degree

LAWFORD, G. R.
"Studies on the Biosynthesis of Glycoproteins"
TSAI, MRS. J. H. J.
"Chemical and Enzymological Studies of Cytochrome C"

M.Sc. degree

BRECKENRIDGE, W. C.
"A Comparative Study of the Triglyceride Structure of Bovine and Human Milk Fat"
CAMPBELL, D. W.
"The Enzymatic Fragmentation of Human Haptoglobin"
HOGG, MISS N. M.
"Aspects of the Primary Structure of a Bence-Jones Protein"
JACKSON, MRS. S. A.
"Peptides Released by the Action of Elastase on Elastin"
KEOUGH, K. M. W.
"Triphospho-inositide Hydrolysis in Rat Brain"
SCRIMGER, MRS. S. T.
"Studies on the Active Site of Trypsin"

The Department acquired extended facilities for research during the year in renovated laboratories in the Spadina Division of Connaught Laboratories. These new quarters were occupied by Professors Green, Kay, and Tinker and their associates. Dr. Green has subsequently resigned his position and has joined the staff of the Fisheries Research Board in Halifax. Dr. K. G. Scrimgeour will join the staff of the Department on July 1, replacing Dr. Green. Mr. L. Pinteric has joined the staff of the Department as a Research Associate and he has taken charge of the electron microscopic work under a joint arrangement with the Department of Anatomy. Dr. R. K. Murray has continued on leave of absence at the University of Wisconsin, and Dr. H. Schachter has begun a two-year leave of absence at Johns Hopkins University.

SCHOLARLY ADDRESSES

G. E. CONNELL, "Structure and Function of Immunoglobulins," Lectures given at McMaster University, University of Waterloo, Queen's University, Chapters of the Chemical Institute of Canada at Suffield, Alberta, Calgary, Saskatoon, Vancouver, Jan.–Feb., 1967; "Enzymes which act on Gamma Glutamyl Peptides," Department of Biochemistry, University of British Columbia, Vancouver, Jan., 1967.

T. HOFMANN, "On the Mechanism of Zymogen Activation," University of Alberta, July, 1966; "Chemical Studies on Serine Proteinases," Cornell University, May, 1967.

T. HOFMANN, H. SCHACHTER, J. W. DIXON, C. BURROWS, A. GERTLER, and S. T. SCRIMGER, "Kinetics of Inactivation of Trypsin, Chymotrypsin and Elastase by Nitrous Acid," *Federation Proceedings*, vol. 26, 1967, p. 3194.

E. R. M. KAY, "Incorporation of Macromolecules by Mammalian Cells," Toronto Biochemical and Biophysical Society, Nov., 1966.

F. A. MCELROY and G. R. WILLIAMS, "Metambolism of Succinate $-1,4-{}^{14}C$ by Rat Heart Mitochondria," *Federation Proceedings*, vol. 26, 1967, p. 810.

S. MAGNUSSON, J. RESENDES, and T. HOFMANN, "Chemical Aspects of Thrombin," Toronto Biochemical and Biophysical Society, April, 1967.

J. F. MANERY, "Ion Transport in Muscle and Associated Membrane Events," University of Ottawa, Nov., 1966.

J. F. MANERY, J. R. RIORDAN, and R. J. BOEGMAN, "Enzyme Activity at Muscle Surfaces," *Federation Proceedings*, vol. 26, 1967, p. 596.

M. A. PACKHAM, S. WARRIOR, M. F. GLYNN, E. E. NISHIZAWA, and J. F.

MUSTARD. "The Effect on Platelet Function of Altering the Platelet Surface Reaction," Canadian Society for Clinical Investigation, Jan. 18–19, 1967.

M. A. PACKHAM, J. STILL, A. SENYI, and J. F. MUSTARD, "Fate of C^{14} – ADP during Platelet Aggregation," *Federation Proceedings*, vol. 26, 1967, p. 760.

M. A. PACKHAM, E. E. NISHIZAWA, and J. F. MUSTARD, "The Response of Platelets to Tissue Injury," *Biochemical Pharmacology* (Suppl.) in press; Brook Lodge Conference on Inflammation, May 31–June 2, 1967.

J. R. RIORDAN and J. F. MANERY, "Muscle Surface Enzymes which Convert ATP to IMP," Toronto Biochemical and Biophysical Society, Feb., 1967.

H. SCHACHTER, "Polyribosomes from Rat Liver Nuclei," *Proceedings*, Canadian Federation Biological Societies, vol. 9, 1966, p. 66 (abstract); "The Subcellular Site of Liver Glycoprotein Biosynthesis," *ibid.*, vol. 9, 1966, p. 79 (abstract).

H. SCHACHTER and G. R. LAWFORD, "The Inhibition of Rat Liver Polyribosome Breakdown in the Presence of Post-microsomal Liver Supernatant," *Proceedings*, Canadian Federation Biological Societies, vol. 25, 1966, p. 778 (abstract).

D. O. TINKER, "The Ternary Systems Phosphatidyl Choline-Alcohol-Water"; work begun in the laboratory of Professor L. Saunders, University of London, was presented to the Toronto Biochemical and Biophysical Society, May, 1967.

G. R. WILLIAMS, "The Effect of Adenosine Diphosphate on the Metabolism of Pyruvate in Isolated Mitochondria," Department of Biophysics and Physical Biochemistry, Johnson Research Foundation, University of Pennsylvania, Oct., 1966; "Control Sites in the Citric Acid Cycle," Department of Biochemistry, Western Reserve University, Dec., 1966, and Department of Biochemistry, State University of New York at Buffalo, Dec., 1966.

RESEARCH

Members of the Department have received generous grants from the Medical Research Council, the National Research Council, the Canadian Arthritis and Rheumatism Society, the J. P. Bickell Foundation, and the University of Toronto Cancer Research Committee.

In Professor Anwar's laboratory the study of elastin and its degradation under the action of elastase has continued. Mr. W. Shimada is engaged in the isolation of the desmosine- and isodesmosine-containing peptides from the elastase digests of elastin and has achieved a considerable purification of these peptides. Specificity studies on the purified elastase with the use of insulin chains, and the separation and purification of a second proteolytic enzyme present in crystalline elastase are currently in progress. As a part of a study of the biosynthesis of desmosine and isodesmosine, Mr. N. Davis is developing techniques for the systematic degradation of pyridinium rings of these amino acids. Mr. K. G. Gunetileke has established the pathway for the biosynthesis of uridine diphospho-N-acetylmuramic acid in Aerobacter cloacae NRC 492. Miss J. Oliver has begun work on the comparative study of the biosynthesis of uridine diphospho-N-acetylmuramic acid in different micro-organisms.

In Professor Connell's laboratory Dr. A. F. Lewis, Dr. J. J. B. Armstrong, Mrs. B. Tattrie, and Mrs. C. Luks have worked on various aspects of the structure of immunoglobulins. Mrs. E. Adamson has undertaken the purification of γ-glutamyl lactamase from liver. Mr. W. Campbell has worked on the characterization of enzymatic fragments derived from human haptoglobin by enzymatic digestion.

Professor J. Manery Fisher and her associates, Mrs. E. Dryden and Mrs. T. Ambus, have continued their investigation of the effects of insulin on carbohydrate metabolism and cation transport in frog muscle. Mrs. J. Still has shown that the inhibition of cation transport in muscle by ouabain was enhanced by ATP in the external medium, and by removing Ca and Mg ions from the medium; these observations can be intepreted in terms of an alteration in the cation-binding affinity of sites on the membrane transport enzyme. Using intact muscle bundles Mr. J. R. Riordan found that the muscle surface enzymes which convert ATP to IMP were sensitive to

K, Na, and Mg ions. Mr. Boegman has prepared muscle membranes which show a high degree of purity when examined with the electron microscope (in collaboration with Mr. L. Pinteric). If these prove to be particles of muscle sarcolemma it is significant that they retained, throughout the entire preparative procedure, a tightly bound Mg-ATPase activity, and a much more loosely bound AMP deaminase and lactic acid dehydrogenase (studies by Mr. D. Stewart). Research on ion transport in red cells was commenced by Mr. B. Mutter who showed that β-diolein enhanced the ATP-supported Na efflux from human cells. Dr. J. Forstner has undertaken a study of the role of Ca ions in the control of red cell permeability, as well as the specific Ca binding sites on erythrocyte membranes.

During the year under review, Professor C. S. Hanes spent six months at Cambridge University on study leave. This was devoted to extending the generalized kinetic theory of enzyme action developed earlier in collaboration with Professor J. T. Wong, and to applying the new approach to identification of a number of enzyme mechanisms, especially that of sucrose phosphorylase. These results will form parts of a monograph on enzyme kinetics which is now being written in association with Professor Wong. Investigations on the structure of elastin and its breakdown under the action of elastases were carried further in a concerted programme with Professor Anwar.

Professor Hofmann and his colleagues, Miss J. Dixon, Miss S. Wasi, and Mr. C. Borrowes, have continued the investigation of the role of the N-terminal amino acid in the active site of proteases. It has been established that the enzymes trypsin, chymotrypsin, elastase, and thrombin are homologous in the function of the N-terminal amino group. Fluorescence and ultraviolet difference spectrophotometry have been used by Miss Wasi to study an interesting conformational change in the enzyme elastase. In collaboration with Dr. Nyburg from the Department of Chemistry, work has started on a project to determine the structure of elastase by X-ray analysis. Mr. Sodek has started work on the active site and the mechanism of action of the peptidase A from a penicillium. An inhibitor has been found which appears to label the active site and thus make it amenable for chemical study. The enzyme resembles pepsin in its amino acid composition and in many of its enzymatic properties. A comparison of the two enzymes should add considerably to our understanding of their mechanism of action.

Professor E. R. M. Kay who joined the staff in September, 1966, has begun work on the nucleic acid and protein metabolism of Ehrlich ascites tumour cells, a field in which he had made many contributions while at the University of Rochester. His present investigations are concerned with incorporation of macromolecules by tumour cells, and with elucidating the effects of the cytotoxic agent vinblastine on metabolic processes in tumour cells.

Dr. M. A. Packham has been investigating the response of platelets to stimuli which cause platelet aggregation and the release of platelet constituents. The inhibitory effects of the pyrazole drugs of this release reaction have been studied. One of the materials released is a factor (or factors) which increases the permeability of vessels in the microcirculation and causes smooth muscle contraction. Some of the properties of this factor have been determined.

Mr. L. Pinteric has initiated a research programme on the electron microscopy of protein crystals. He has also collaborated with several members of staff in application of electron microscopic methods in their work.

Dr. W. Thompson is continuing studies on phosphoinositides in the central nervous system, with the assistance of Mr. K. Keough. The breakdown of triphosphoinositide has been examined. Enzymes exhibiting phospholipase C activity towards this substrate appear to be present in both soluble and membrane-bound forms. The metabolism of phosphoinositides in brain during the period of myelination is currently under study. In a continuation of work on mitochondrial structure and function, Mr. J. Parkes is examining the distribution of phospholipids, fatty acids and various enzymes in outer and inner membranes from mitochondria.

Professor D. O. Tinker, who joined the staff of the Department in September, 1966, has initiated research on the chemistry of phospholipids and the structure and mode of action of phospholipases. Several naturally occurring phosphatides have been isolated, and a homologous series of saturated homo-acyl phosphatidic acids has been synthesized for use in future studies. Mr. T. Wu has begun work on the purification of phospholipase A from *C. atrox* venom, and Mrs. B. Lavers has been studying the lipid composition of certain tumours, and livers from tumour-bearing mice in a study jointly supervised by Dr. W. Thompson.

In Professor Williams' laboratory, Miss Jeanne Orr has been studying the fractionation of mitochondrial membranes by non-ionic detergents in an attempt to bring about a controlled dissection of the oxidative phosphorylation system. In related work, Miss Gloria Perry has been studying the enzymic and structural differences between phosphorylating and non-phosphorylating submitochondrial particles. Mrs. S. C. Stuart has completed her studies of the control of the tricarboxylic acid cycle in liver mitochondria with the identification of the malate-citrate region as a dominant control site of ADP. Dr. Frances McElroy has been using a different approach to probe the same system in heart mitochondria and has been able to produce data on specific activities of intermediates which should permit sophisticated modelling of the citric acid cycle.Miss Kirsten Skov has been studying the reduction of cytochrome c by ascorbate using rapid reaction techniques with particular attention being paid to the conformation-sensitive 695 μ band in relation to reactivity.

In Dr. Wong's laboratory, the possibility of varying the permease concentration in bacteria by the process of enzyme induction has been utilized by Miss P. M. Horlock to study the relationship between initial rates of sugar transport and permease concentration. A linear relationship has been observed, and this provides the first valid support for the use of steady-state kinetics to analyse cellular transports. Mrs. M. Mustard is developing an *in vitro* assay method to measure the cellular levels of different species of amino-acid acceptor RNA. Preliminary results substantiate previous conclusions regarding the regulation of these species as obtained in this laboratory with an *in vivo* assay method. Mr. R. N. Nazar is investigating the relationship between energy metabolism and RNA synthesis in the bacterial cell. In collaboration with Professor G. R. Williams, a study of the isotopic exchange between ethanol and acetaldehyde catalysed by alcohol dehydrogenase has been completed, and his results throw serious doubts on a current theory of dehydrogenase action involving the existence of a reduced enzyme.

Publications

Anwar, R. A., Donovan, R. G. and Hanes, C. S. "Comparison of Elastins from Various Sources" (*Proceedings of the 3rd Canadian Conference on Research in the Rheumatic Diseases*, 1966, pp. 255–8).

Anwar, R. A. and Oda, G. "The Biosynthesis of Desmosine and Isodesmosine" (*Journal of Biological Chemistry*, vol. 241, no. 2, Oct., 1966, pp. 4638–41).

——— "The Biosynthesis of Desmosine and Isodesmosine: II, Incorporation of Specifically Labelled Lysine into Desmosine and Isodesmosine" (*Biochimica et Biophysica Acta*, vol. 133, no. 1, Jan. 18, 1967, pp. 151–6).

——— "Structure of Desmosine and Isodesmosine" (*Nature*, vol. 210, no. 5042, June 18, 1966, pp. 1254–5).

Connell, G. E. and Painter, R. H. "Enzymatic Fragments of Human Immunoglobulin" (*Proceedings of the 3rd Canadian Conference on Research in the Rheumatic Diseases*, 1966, pp. 25–7).

Connell, G. E., Smithies, O. and Dixon, G. H. "Gene Action in the Human Haptoglobins: II, Isolation and Physical Characterization of Alpha Polypeptide Chains" (*Journal of Molecular Biology*, vol. 21, no. 2, Nov. 14, 1966, pp. 225–9).

Donovan, R. G., Anwar, R. A. and Hanes, C. S. "A Picture of the Breakdown of Elastin under the Action of Elastase" (*Proceedings of the 3rd Canadian Conference on Research in the Rheumatic Diseases*, 1966, pp. 231–5).

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COMMITTEE ON ANIMAL CARE

Under the chairmanship of Professor A. G. Gornall

The Committee met as circumstances required during the year. Requests for animal care continue to overcrowd the very limited facilities of the Committee. With more and more rooms in the Banting Institute being converted to research use it can be predicted that the animal quarters will become a serious rate-limiting factor in the progress of research. A decision to provide holding facilities for animals at the Connaught Dufferin campus will help to a limited extent. It will almost certainly be

necessary to make provision for additional animal facilities in the Banting Institute within a year. Possibilities in this direction are now being explored.

Dr. Steinbeck has continued to provide excellent veterinary care of the animals in our facilities. Mr. A. H. Insley retires this year after many years of faithful service, latterly as Chief Animal Room Attendant. The problem of attracting competent staff has been eased by an improved salary scale and an effort to institute training programmes. Adequate temperature control now extends to most of the animal rooms.

The Committee welcomes the appointment of a Director of Animal Facilities for the University of Toronto Medical Centre. This action will serve to provide, through the directors of local facilities, a degree of co-operation and the advantage of a co-ordinated approach to problems. It is strongly recommended that a balance of responsibility between the users and the directors be maintained by having in each local setting a User's Committee on Animal Care. The chairmen of these committees, in addition to a local function as administrative consultants, should form an advisory body representing the research workers of the Faculty in discussions with the Director of Animal Facilities. In this context the Animal Care Committee of the Banting Institute provides an example that has worked smoothly and could well be a pattern for administration on a larger scale.

One development that is causing concern to the Committee is the tendency for a growing number of research workers to establish animal operating facilities that are entirely separate and independent. This trend does not appear to be in the best interests of research or of the staff in the Banting Institute as a whole.

Dr. Gornall and Dr. Steinbeck have both served on a committee planning animal facilities for the new Clinical Science Building at Toronto General Hospital.

Reported by Dr. F. H. Steinbeck

The facilities of the Committee on Animal Care were used by thirty-seven research workers in the 1966–67 academic year. Experimental animals housed included dogs, cats, guinea pigs, rats, rabbits, calves, and pigs. There were approximately six hundred operations performed, compared to 564 in 1965–66. The majority were sterile procedures.

The following diseases and parasitic conditions were diagnosed in the animal colony: (a) dogs—distemper, rhinitis, tracheobronchitis, bronchopneumonia, ascariasis, as well as infestation with a wide range of other internal and external parasites; (b) cats—panleukopenia, bronchopneumonia, pneumonitis, enteritis, bacterial and parasitic otitis, internal and external parasites; (c) rabbits—pneumonia, conjunctivitis, enteritis, ear mite infestation; (d) guinea pigs—dermatitis, subcutaneous abscesses; (e) calves—pneumonia, enteritis. A reduction in the number of diseases and of animal losses is due to vigorous preventive measures, careful checking and culling of animals before and after entering the colony.

The facilities of the animal colony were improved by the purchase of two racks of stainless steel rabbit cages. One operating room is now air conditioned. A new cold cautery unit and one used anaesthetic machine were purchased. All dogs are vaccinated against canine distemper and hepatitis and all cats are vaccinated against panleukopenia (feline distemper). Quarantine was carried out as far as possible. A small number of beagles, bred for research use and guaranteed to be free from any of the major canine diseases, are now being used.

Our most promising technicians are being trained in Laboratory Animal Care to make them eligible for eventual certification. One of our major goals will be to supply trained technicians for the expanding field of Laboratory Animal Medicine.

During the past year a few lectures and demonstrations were given by Dr. Steinbeck to students in the Department of Art as Applied to Medicine.

MEDICAL BIOPHYSICS

Under the direction of Professor H. E. Johns

During the last year, Professor G. F. Whitmore received the David Anderson-Berry Prize for basic radiobiological research of value to Radiotherapy from the Royal Society of Edinburgh. Professor Louis Siminovitch delivered the Major G. Seelig Lecture at Washington University, St. Louis, Missouri. Professor G. Cinader was elected President of the Canadian Society for Immunology and appointed a member of the Committee of the American Society for Immunology which is to deal with the problem of postgraduate summer schools and with the International Congress of Immunochemistry and Immunobiology. Professor McCulloch was made a member of the Programme Committee of the American Association for Cancer Research.

Undergraduate teaching. Professor Johns gave half the course in Physics to pre-medical students; Professor Cinader gave lectures to medical students in Pathology and Pathological Chemistry; Professor Howatson gave Physics 460; Professor McCulloch gave the course in Clinical Microscopy.

Graduate teaching. Last year 37 students were enrolled in the Department doing work towards the M.Sc. and Ph.D. degrees. Fourteen postdoctoral fellows pursued research studies in the Department.

Postgraduate teaching. Professors Baker, Bruce, Cinader, Howatson, McCulloch, Siminovitch, Stanners, and Till gave postgraduate lectures for the Division of Postgraduate Medical Education. Professor Cunningham and Professor Taylor gave the Physics part of the diploma course in Radiology.

Scholarly Addresses

N. Aspin, "Regional Pulmonary Function Studies in Monkeys," Society of Nuclear Medicine, Toronto, November, 1966.

W. R. Bruce, "Comparison of the Sensitivity of Normal Hematopoietic and Transplanted Lymphoma Colony-Forming Cells to Chemotherapeutic Agents." Ninth International Cancer Congress, Tokyo, Japan, October, 1966; "Studies of the Action of Chemotherapeutic Agents at the Cellular Level," Department of Pharmacology, Yale University, New Haven, November, 1966; Ontario Society of Biologists, January, 1967; the Upjohn Company, Kalamazoo, U.S.A., January, 1967; Cancer Institute, Philadelphia, Pa., February, 1967; University of Saskatchewan, Members of the Medical Profession, University Hospital, Departments of Cancer Research and Therapeutic Radiology, March, 1967; University of Saskatchewan, Physics Club, March, 1967; Regina, Grey Nuns' Hospital and the Alan Blair Memorial Clinic, March, 1967; Regina Campus, University of Saskatchewan, March, 1967; "The Effects of Radiation and Various Chemotherapeutic Agents on the Survival of Normal Hematopoietic and Tumor Stem Cells," the Radiological Society of North America, Inc., Chicago, December, 1966; "Cellular Radiation Biology," Camp Borden, Ontario, January, 1967; "Challenge of Research," Annual Meeting of Ontario Cancer Society, February, 1967; with F. A. Valeriote, "Normal and Malignant Stem Cells and Chemotherapy," 21st Annual Symposium on Fundamental Cancer Research, Houston, Texas, February, 1967, and "Survival of Mice Bearing a Transplanted Lymphoma Following Treatment with Different Chemotherapeutic Agents," American Association for Cancer Research, Chicago, March, 1967; "The Sensitivity of Normal and Tumor Skin Cells to Chemotherapeutic Agents," Department of Molecular Biology, Massachusetts Institute of Technology, Boston, Mass., April, 1967; "Studies of the Action of Chemotherapeutic Agents at the Cellular Level," Newfoundland General Hospital, Department of Radiotherapy, April, 1967; "Recent Developments in Cancer Research," St. John's Rotary Club and Radio Station, April, 1967; "Testing of Antineoplastic Drugs," Symposium of the Canadian Society of Chemotherapy, May, 1967; "The Survival of Normal Hematopoietic

and Lymphoma Colony-Forming Cells Exposed to Continuous and Fractionated Gamma Radiation over 24 Hours in Mice," Radiation Research Society Meeting, Puerto Rico, May, 1967; "Pharmacological Aspects," Conferences on Acute Leukemia, American Cancer Society and National Cancer Institute; "Studies of the Action of Antitumor Agents at the Cellular Level," American Radium Society, May, 1967; Massachusetts Institute of Technology, Boston, Mass., June, 1967; "Mechanism of the Action of Cyclophosphamide in Relation to the Cell Cycle," Cancer Chemotherapy Symposium, Montreal, June, 1967.

B. CINADER, "Steering Mechanism of Antibody Formation and Immunological Tolerance," Laurentian Residential Summer School, P.Q., July, 1966; "The Mechanism of Enzyme Inhibition by Antibody," VI International Congress of Clinical Chemistry, Munich, Germany, July, 1966; "Inborn Metabolic Errors and Steering Mechanism," Invited Lecture at Institute of Genetics, Koln, Germany, July, 1966; "Regulation of the Antibody Response, Immunological Tolerance and Autoimmunity," Faculty of Dentistry, University of Toronto, October, 1966; "Immunological Tolerance," Department of Pathology, University of Toronto, November, 1966; "La Tolerance et la Regulation de la Specificité," Seminar, Université Laval, Québec, December, 1966; "Regulatory Aspects of an Antigen Defect," Seminar, Walter Reed Army Institute of Research, Washington, D.C., January, 1967; "Some Research Problems in Immunochemistry," Department of Pathological Chemistry, University of Toronto, February, 1967; "Immune Mechanisms and Disease," Department of Pathological Chemistry, University of Toronto, February, 1967; "Fact and Fiction: Antibody-Formation," "Immunological Consequences of Polymorphism," "Tumor Immunology," and "Antibodies to Enzymes," University of Manitoba, Winnipeg, March, 1967; "Some Immunological Consequences of Polymorphism: An Introduction," Symposium, Canadian Society for Immunology, Université Laval, Québec, May, 1967; "Allotypic Specificity and Hemolytic Capacity of Antibodies Produced by Single Cells," Symposium, Cold Spring Harbor, Long Island, N.Y., June, 1967.

J. R. CUNNINGHAM, "A Generalized Scatter Function for Computer Calculation of Dose in a Phantom," International Conference on the Use of Computers in Therapeutic Radiology, Cambridge, England, June, 1966; "Use of Computers in External Beam Treatment Planning," Conference on the Use of Computers in Radiology, Chicago, Illinois, October, 1966; "Units Used in Radiation Dosimetry" and "Recent Advances in Radiation Dosimetry," National Congress of Radiology, Leon, Mexico, May, 1967; with J. A. RAWLINSON, "An Automatic Compensator Cutter," Canadian Association of Physicists, Sherbrooke, Quebec, June, 1966.

M. J. FRAZER, "An Attempt to Isolate the Transfer RNA Genes," Mayo Clinic, Rochester, Maine, September, 1966; Manitoba Cancer Treatment and Research Foundation, Winnipeg, Man., September, 1966; Biology Department, University of Ottawa, Ottawa, October, 1966; Atomic Energy of Canada Limited, Chalk River, Ont.; St. Jude Children's Hospital, Memphis, Tenn.; "New Concepts of Heredity: I, Solving the Riddle of the Genetic Code; II, Can Man Control his Biological Future?" Trent University, Peterborough, Ont.

A. F. HOWATSON, "Electron Microscope Studies on Mutants of λ-bacteriophage," New College of Medicine and Dentistry, Department of Microbiology, October, 1966.

J. W. HUNT, with J. K. THOMAS, "Pulse Radiolysis at Nanosecond Times," Gordon Conference on Radiation Chemistry, New Hampton, Vermont, August, 1966; with J. S. HASKILL, "Formation of Damaged Products in Irradiated Ribonuclease," 15th Annual Meeting of the Radiation Research Society, Peurto Rico, May, 1967; "Pulse Radiolysis at Nanosecond Times," U.S. Army Natick Laboratories, Natick, June, 1967; "Pulse Radiolysis Studies of Nucleic Acid Derivatives," Tripartite Meeting, American Physical Society, Canadian Association of Physicists and La Sociedad Mexicana de Fisica, Toronto, June, 1967.

H. E. JOHNS, "Photoproducts Produced in Nucleic Acids by UV Light," 3rd International Congress of Radiation Research, Cortina, Italy, July, 1966; "UV Effects on the Pyrimidines and Their Relation to the Genetic Code," Windsor University, December, 1966; "The Effects of UV on Nucleic Acids," Waterloo University, January, 1967; "UV Effects on Model Nucleic Acid Compounds," Stanford University, March, 1967; California Institute of Technology, March, 1967.

E. A. MCCULLOCH, "The Control of Colony-forming Cells," Stem Cell Conference, Brisgnau, Germany, June, 1966; "Quantitative Studies on Stem Cells," St. Thomas's Hospital, London, England, October, 1966; "Studies of Stem Cells, Using Transplantation Techniques," MRC Radiobiological Unit, Harwell, England, October, 1966; "The Control of the Proliferation and Differentiation of Hemopoietic Stem Cells," The Institute for Cancer Research, Surrey Branch, England, October, 1966; "Control of Haemopoiesis in Mice," Department of Biology, McMaster University, Hamilton, Ontario, December, 1966.

A. M. RAUTH, "Evidence for the Dark-Reactivation of Mitomycin C Damage in Mouse L Cells," Biophysical Society, Houston, Texas, February, 1967; "Cells, Chemotherapy and Cancer," North York Cancer Society, October, 1966.

L. SIMINOVITCH, "Studies on Development of Lambda Bacteriophage," Department of Biology, McMaster University, Hamilton, Ont.; Annual Meeting Paediatric Travel Club, Toronto, Ont.; "Physiological and Genetic Studies on the Temperate Bacteriophage Lambda," Canadian Department of Agriculture, Research Branch Seminars, Ottawa, Ont.; "Studies on Proliferation and Differentiation of Hemopoietic Cells in the Mouse," The Major G. Seelig Lecture, Washington University School of Medicine, St. Louis, Missouri; "Proliferation and Differentiation of Haemopoietic Stem Cells," University of California, Berkeley, California; Stanford University, Palo Alto, California; "Physiological and Genetic Studies of λ Bacteriophage," California Institute of Technology, Pasadena, California; Stanford University, Palo Alto, California; "Studies on λ Bacteriophage Development," Roswell Park Memorial Institute, Buffalo, U.S.A.

C. P. STANNERS, "Studies on Ribosome Dimers in Hamster Embryo Cells," Toronto Biophysical and Biochemical Society, February, 1967.

J. E. TILL, "Studies on Hemopoietic Stem Cells," Argonne Cancer Research Hospital, Chicago, Illinois, November, 1966; "Aging of Cells and Cell Strains," Fifth Conference on Cellular Dynamics of the New York Academy of Sciences, Princeton, N.J., January, 1967; "Aspects of the Regulation of Stem Cell Function," 21st Annual Symposium on Fundamental Cancer Research, Houston, Texas, February, 1967; McArdle Laboratory for Cancer Research, Madison, Wisc., May, 1967; "Normal Stem Cells," 49th Annual Meeting of the American Radium Society, Toronto, May, 1967; with E. A. MCCULLOCH, R. A. PHILLIPS, and L. SIMINOVITCH, "Analysis of Differentiating Clones Derived from Marrow," 32nd Cold Spring Harbour Symposium on Quantitative Biology; with E. A. MCCULLOCH, "Stem Cell Function Related to the Repair of Radiation Damage," Symposium on Recovery and Repair Mechanisms in Radiobiology.

G. F. WHITMORE, "Recovery Process on X-Irradiated L Cells," Congress of Radiation Research, Cortina, Italy, July, 1966; "Radiation-Induced Mitotic Delay in Mammalian Cells," A Conference on Radiation Damages in Synchronized Populations, Casaccia, Italy, July, 1966; Refresher Course in Radiobiology, Radiological Society of North America, Nov., 1966; "Some Effects of Radiation on Mammalian Cells in Tissue Culture," Carleton University, Ottawa, June, 1967; Mammalian Cell Radiobiology, a Course of 10 Lectures, Charity Hospital of New Orleans, New Orleans, February, 1967; "Repair Processes in Irradiated Mammalian Cells," M. D. Anderson Hospital, Houston, Texas, April, 1967; "The Role of Radiobiology in Radiotherapy," summary, Radiation Research Society, Puerto Rico, May, 1967; "The Repair of Radiation Damage in X-Irradiated L Cells." Christie Hospital and Holt Radium Institute, May, 1967.

Research

The research work of the Department entailed a great deal of collaboration between various members of the staff along the following lines: (1) Molecular Radiation Biology, (2) Studies on Viruses, (3) Effects of Radiation and Drugs on Mammalian Cells, (4) Studies on Blood-Forming Cells, (5) Immunological Studies, (6) Biochemical Studies, (7) Clinical Physics Applied to Radio-diagnosis and Radiotherapy.

Molecular Radiation Biology

Professor J. W. Hunt has continued his studies of the transient intermediates produced by ionizing radiation in systems of biological interest. The availability of short, intense pulses of radiation from the recently installed Linear Accelerator in the Physics Department of the University of Toronto has made it possible to study the chemistry of reactive species produced by the radiation which have lifetimes as short as one microsecond. Using this accelerator to produce pulses of solvated electrons Professor Hunt, with Mr. C. L. Greenstock, Dr. M. Eng, and Mr. M. Bronskill, have been studying the reaction of these electrons with nucleic acid derivatives. The differences of reaction rates of pyrimidines and their nucleosides and nucleotides appear to be chiefly due to differences in the charges on these molecules. These studies are being expanded to include the reactions of hydroxyl radicals, and the identification of the radiation products produced.

Professor Hunt, with Dr. S. Haskill, has completed studies on radiation damage to the dry, crystalline enzyme, ribonuclease. It was found that a large fraction of the damage could be accounted for by cleavage of the polypeptide chain.

Professor Hunt, with Dr. P. Leung, used electron spin resonance (ESR) techniques to study the formation and decay of free radicals in cyclohexane carboxylic acid. By observing the ESR spectrum at a wide range of temperatures, the complex chain of events involved in the formation and transfer of radiation damage in this compound were followed.

Dr. Weinblum, working with Professor Nyberg of the Chemistry Department and Professor Johns, is studying the detailed structure of thymine dimers with X-ray diffraction techniques.

Dr. Sarin with Professor Johns using optical Rotary Dispersion has measured the change in the secondary structure of transfer RNA upon ultraviolet irradiation. They have shown that about one photoproduct produced in the transfer RNA molecule destroys its ability to bind to amino acids.

Professor Johns with Dr. Mark Pearson and Mr. De Boer has shown that when poly U is complexed with $MgCl_2$, spermine, or poly A, and is irradiated below its melting point, the complexes are insensitive to irradiation and that in these ordered structures, hydrates are not produced.

Professor Johns with Professor Hunt, Mr. I. H. Brown, and C. Greenstock have shown that when uracil or thymine or their derivatives are irradiated in aqueous solutions the yield of dimers is reduced by the presence of oxygen tension. These results suggest that the dimers arise from an excited triplet state of mean lifetime of about one microsecond.

Professor Whitmore in collaboration with Mr. P. Ottensmeyer is continuing his studies on the ability of irradiated trinucleotides to act as messengers in polypeptide biosynthesis. To date these studies have demonstrated that the introduction of a uracil dimer or a uracil hydrate into a uridine trinucleotide molecule will bring about changes in the coding properties of the trinucleotide. The dimer of Uracil (U) may code as UU or GU while the hydrate codes as cytosine.

Professor Whitmore is continuing his studies on the ability of mammalian cells to recover from certain types of radiation damage. These studies have demonstrated the existence of a class of potentially lethal lesions. The probability that these lesions will bring about the death of the cell is related to the rate at which RNA is being

synthesized. In addition, in collaboration with Dr. L. D. Skarsgard of Yale University, studies have been carried out on the sensitivity of mammalian cells to the action of accelerated heavy nuclei such as fully charged boron, carbon, and oxygen ions. To date these experiments indicate that the variation in radiation sensitivity with cell age is very similar with both X-rays and heavy ions suggesting that repair phenomena do not play a major role in determining sensitivity around the cell cycle.

Professor Rauth has extended his study of the repair of damage produced by ultraviolet light in mouse L cells to include damage caused by the chemotherapeutic agent Mitomycin C. This agent is thought to bind to deoxyribonucleic acid preventing strand separation upon cell replication. If cells are treated with Mitomycin C and immediately plated in the presence of caffeine their survival is lower than when they are plated in the absence of caffeine. The ability of caffeine to reduce cell survival is completely lost if they are incubated in the absence of caffeine for a time equal to the doubling time of the cell.

Studies on Viruses

Professor Howatson, in collaboration with Professor Siminovitch, has continued studies on structural abnormalities of λ-bacteriophage associated with mutations on the left arm of the chromosome, with the object of clarifying the functional role of cistrons on this region of the chromosome. With Dr. Easterbrook, he has been investigating the assembly *in vitro* of complete infectious λ-bacteriophage from sub-viral components.

In collaboration with Dr. Nakai and Dr. Holloway, Professor Howatson has been examining the structure and morphogenei of vesicular stomatitis virus and the relation of the truncated uninfectious form of the virus to the infectious particle. In order to facilitate these studies they have been attempting to isolate temperature-sensitive mutants of the virus.

Analysis of the physiological genetics of the temperate bacteriophage lambda was continued by Professors Siminovitch and Fuerst and their associates. It has now been shown by genetic analysis of lysogenic bacteria carrying conditional lethal mutants of lambda that curing of cells of prophage occurs through scission and subsequent repair of the host chromosome. Several new deletion and substitution mutants, all localized within the middle third of the lambda chromosome, have been obtained. Mutants of this kind have been used to partially resolve the location of phage genes active in lysogenization, transduction, and restriction of phage T4rII.

Effects of Radiation and Drugs on Mammalian Cells

Professor Whitmore in collaboration with Mr. J. Borsa has been studying the effects of Methotrexate on mammalian cells grown *in vitro*. Some early experiments based on cell toxicity had suggested that Methotrexate might act as an inhibitor of the enzyme thymidylate synthetase, and these suggestions have since been verified using *in vitro* assays of enzyme activity.

Professor W. R. Bruce has continued his studies of the action of chemotherapeutic agents on mice bearing transplanted leukemias. Detailed studies of the action of two alkylating agents, cyclophosphamide and BCNU (1, 3-bis(2-chlorethyl)-1-nitrosourea), on this model tumour system were carried out in collaboration with Dr. F. A. Valeriote. The reasons for the failure of these agents to cure mice were examined and were found to differ. Combinations of the two, however, were effective in ridding the animals of the advanced lymphoma. Studies now in progress indicate that other combinations of agents may also be effective in the treatment of this model tumour. It remains to be determined whether the results obtained with the transplanted lymphoma are applicable to tumours that have arisen spontaneously.

Dr. Madoc-Jones, with Professor Bruce, has continued his studies of the action of chemotherapeutic agents on the viability of mammalian cells *in vitro*. These studies, using 5-flurouracil, show that the sensitivity of cells in the body to chemotherapeutic agents may be profoundly affected by trace quantities of normal nucleotides in the plasma.

Studies on Blood-Forming Cells

Professors McCulloch, Siminovitch, and Till have continued their studies of the regulation of cellular proliferation and differentiation in the hemopoietic and immune systems. In collaboration with Dr. A. M. Wu, it has been shown that hemopoietic stem cells detected by the spleen-colony method are multipotent, in that radiation-induced chromosomal markers generated in these cells are later found in both erythropoietic and granulopoietic cells.

Attempts to obtain purified populations of hemopoietic stem cells and to grow these populations in cell culture have continued. It has been shown that mice given multiple injections of bacterial endotoxin contain an increased proportion of stem cells in their spleens. In collaboration with Mr. R. G. Worton, it has been found that density-gradient centrifugation of spleen cells from endotoxin-treated animals yields cell suspensions in which the proportion of stem cells has been increased over 300-fold. In collaboration with Dr. J. S. Senn, it has been shown that human marrow, like mouse marrow, contains cells that are able, under appropriate conditions, to grow in cell culture and give rise to colonies containing granulocytes.

Studies on cellular proliferation and differentiation in the immune system have continued in collaboration with Drs. R. A. Phillips, R. G. Miller, and T. Mekori. Evidence has been obtained that marrow contains stem cells capable of repopulating the immune system of irradiated mice, even though the same marrow contains no cells able to respond directly to antigenic stimulation by giving rise to hemolysin-producing cells.

Professor Bruce has aided Professor Painter of the Connaught Laboratories in his project to purify on a large scale the hormone, erythropoietin.

Immunological Studies

Professor Cinader has continued his studies on the regulation of the antibody response. In collaboration with Dr. C. T. Chou and Dr. S. Dubiski a method was developed for the identification of antibody-forming cells in terms of their hemolytic capacity (IgM and IgC antibodies) and their genetic markers (allotypic specificity).

Rabbits were immunized with sheep erythrocytes and antibody-forming cells were obtained whose genotype on the A_b locus (light chains of immunoglobulins) was known.

Methods were developed for *in vitro* assay of antibody-forming cells of given allotypic specificity and the effects of addition of specific antisera to a given allotypic serum during this assay was examined. The results indicate that there are at least two types of plaque-forming cells and that the numbers of these, and their antibody output, change during immunization.

The relative ratio between plaques which produced immunoglobulins of different specificities could be altered by the injection into heterozygous newborn rabbits of antibodies against one of the two light-chain specificities.

Studies on the circumvention of acquired immunological tolerance by cross-reacting antigens are being continued. The effects of the nature and the number of chemical groups in the cross-reacting antigen on the frequency of tolerance breakdown are being examined by Professor Cinader in collaboration with Dr. K. Konishi, Dr. M. Yoshimura, and Dr. J. E. M. St. Rose. It was shown that conformational changes in the carrier protein play an important role in determining the incidence of circumvention of tolerance. It was also demonstrated that a genetic factor participates in this step. These experiments are relevant to a current clinical experiment aimed at inducing antibody to autologous tumour tissue by immunization with chemically altered tumour cells; the study was started in collaboration with Dr. D. W. Whitelaw and is being continued with Dr. J. W. Meakin. So far, 85 patients have been entered into the study.

Professor Cinader had proposed a "steering mechanism" for the regulation of the inheritance of the antibody response in 1961. Since the production of a serum component, MuBl, is under the control of a single gene, it has become possible to test this

hypothesis. From the hypothesis it could be predicted that the inheritance of the ability to make antibody to MuBl would be under the control of a single gene and would appear to be recessive. Experimental results are in full agreement with this prediction.

Biochemical Studies

Professor Stanners has studied the effect of cycloheximide on the free ribosomes and polysomes of cultured hamster embryo cells. In the presence of low concentrations of this drug, the free ribosomes disappeared completely and became attached to the polysomes. This observation was consistent with current models of polysome action, assuming that the drug slowed down ribosome movement on polysomes but had less effect on ribosome attachments.

With Mr. J. M. Taylor, Professor Stanners has demonstrated that the aminonucleoside of puromycin inhibits the synthesis of all classes of RNA equally, in disagreement with the current belief that the drug inhibits the synthesis of ribosomal RNA selectively.

Professor Stanners, with Mr. D. A. Patriarche, has measured the amount and rate of synthesis of DNA, RNA, and protein in cultured hamster fibroblasts during the exponential and stationary growth phases. Preliminary evidence indicates that, whereas the amount of DNA and protein per cell is approximately constant in all growth phases, the amount of RNA per cell varies markedly through the exponential phase, and is very low in the stationary phase. These differences reflect differences in the number of ribosomes per cell and, therefore, in the capacity for protein synthesis.

With Dr. M. E. Blackstein, Professor Stanners has purified the tumour virus, polyoma virus, and extracted the viral DNA. This DNA has been further separated from contaminating cellular DNA, and will be used to detect specific viral messenger RNA in cells rendered malignant by the virus.

Professor Fraser with Dr. K. Hosokawa and Miss A. Salem has continued attempts to isolate the small portion (approximately 0.01%) of the DNA genome which directs the synthesis of amino acid acceptor RNA in the mouse. Purified denatured mouse DNA has been annealed together with purified mouse amino acid acceptor RNA to permit the formation of DNA-RNA hybrids. Only the regions of the DNA which have base sequences complementary to those in the RNA molecules hybridized. The remaining portion of the DNA (approximately 99.99%) was then degraded with enzymes that attack the unhybridized denatured DNA. The use of one such enzyme, exonuclease I, purified from *E. coli B* cells, has now been abandoned, since it has been found impractical to obtain this enzyme in large quantities free of a contaminating enzyme that attacks the DNA-RNA hybrid. Another enzyme, an endonuclease from *Neurospora crassa* conidia, is currently under study. It has been found possible to obtain the purified enzyme in large enough quantities to readily degrade gram quantities of denatured DNA under our operating conditions. Attempts are now being made to isolate enzymically prepared DNA-RNA hybrids. These hybrids can be prepared in relatively large quantities in a radioactive form that can be easily detected. If this model system works, then the more difficult original task of isolating DNA-amino acid acceptor RNA hybrids will be continued.

The purity of the mouse amino acid acceptor RNA that is used to form DNA-RNA hybrids has been examined in some detail. Evidence has been obtained which indicates that this RNA may be contaminated to a small degree with another species of low molecular weight RNA, the so-called 5S RNA, that has previously been detected only in association with the ribosomes of mammalian and bacterial cells. Direct tests for the presence of the contaminant RNA, by hybridization techniques, are currently under way.

Clinical Physics Applied to Radiodiagnosis and Radiotherapy

Professor Cunningham working with Mr. D. Hughes is developing a practical calorimeter for the routine measurement of absorbed dose from ionizing radiations.

Professor Cunningham with Mr. L. Beaudoin and J. Milan is developing high speed computer methods for dose prediction and calculation in radiotherapy. They have been aided in this by a grant from the National Institutes of Health, Washington, in the form of a special fast computer with graphic display. They have also been aided in their work by the installation at the Ontario Cancer Institute of a G.E. time-sharing teletype computer terminal.

Mr. Rawlinson with Professor Cunningham has developed a very sensitive method for the detection of small leaks in radium sources. The method, involving the use of liquid scintillation counting techniques, is more sensitive, by a factor of at least a hundred, than existing techniques and in addition is quantitative.

Professor Aspin and Professor Sass-Kortsak at the Hospital for Sick Children have continued their studies on the uptake and distribution of radioactive copper in members of families with Wilson's disease. In collaboration with Mr. N. Marceau they have measured the rate of intestinal absorption of copper in animals and in some patients.

Professor Aspin, Professor Swyer, and Miss S. Hickling are continuing their investigations of regional lung function in small animals using radioactive xenon and a scintillation camera. Professor Aspin and Dr. Levison have initiated studies of regional lung function in patients with Cystic Fibrosis, Asthma, and Kyphoscoliosis.

Professor Aspin, Professor Moody, and Professor Cobbold are continuing to collaborate in the development of a data-handling system for the scintillation camera.

Dr. K. W. Taylor at the Toronto General Hospital has co-operated in the research projects of several groups in the Banting and Best Institutes and in the Toronto General Hospital. He has started a programme of work on information problems in diagnostic radiology with particular reference to the presentation of information to the radiologist. He is also concerned with new techniques for *in vivo* monitoring of physical and chemical paramenters in patients.

Professor Baker with Mr. B. Weerasekara is conducting a study to determine the extent to which the three-dimensional distribution of radioactive deposits *in vivo* may be determined by analysis of the spectral distribution of the emergent radiations. A study started in collaboration with Dr. J. W. Scrimger to determine optimum physical parameters for a scintillation camera system has been completed and published.

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MEDICINE

Under the direction of Professor K. J. R. Wightman

In these active times, a number of the issues have special significance for the Department of Medicine. Its main function is an integrative one, attempting to tie together the various considerations which make for an understanding of the patient as a whole, and to serve as a bridge and a mediator among all the specialties that may contribute to his care. With our present consideration of organ- or system-oriented teaching, we are also contemplating a role which may carry us vertically into the basic sciences, and bring them into closer relationship with us. The way for this has been prepared to some extent by the degree to which investigative activity has been fostered in clinical departments in the recent past, and the growing interest of basic science departments in things which have a clinical relationship. This growth, and the dawning of some degree of mutual respect, is indicated by the present movement to establish a clinical arm in the School of Graduate Studies—multidisciplinary, but of special interest to the Department of Medicine.

However, this traditional integrative function is being frayed away in two directions. The recent move to place the psychiatrists in the teaching hospitals in a separate department is only partially compensated by the generous gift of the Department of Therapeutics. A very serious discussion was necessary to keep haematology from moving off into the field of pathology, although our latest medical school accreditation team told us that the Department of Medicine should really be teaching pathological chemistry. The neurologists are urging that theirs is a special science, with its own basic disciplines, its own vocabulary, and very special qualifications on the part of its practitioners such as to justify a separate department. Similar arguments could be adduced for at least fifteen other divisions. It might be said that the demands of postgraduate training, research, and special aspects of patient care are adequate to justify some of this fragmentation. On the other hand, it does not serve the undergraduate well, unless his prior training is different than it is now, and there are certain patients who fare less well than one might expect in specialized units.

In an attempt to obtain some of the advantages of this approach, co-ordinators have been appointed in fields such as haematology, neurology, cardiology, and rheumatology—where the size of the operation is such as to indicate the appropriateness of a mechanism which will foster its development and yet allow for its integration into the whole fabric. If this sort of thing is to work it must be carried to the point where the Department is virtually converted into a miniature faculty, with an organization of corresponding complexity. It is quite difficult to superimpose this upon the arrangements at the separate teaching hospitals, which have their own aspirations and problems, and desire to maintain a degree of autonomy.

On the other hand the Department is also in danger of attrition from the "general" side. At all the teaching hospitals, general practitioners have agreed to set up clinics which would afford students an opportunity to see the nature of general practice, and to offer patients that type of service if appropriate to their needs. So far these units have developed in slightly varying ways at the different hospitals under the aegis of the Department of Medicine. However, we are already beginning to hear that they should be separate departments. Obviously, in educational institutions, this request must be interpreted in the light of the educational function that these men are prepared to discharge—a question which may take time to answer, and require time for the special skills which are needed to develop. In addition to all this, there is tremendous movement, growth, and change; the size of the Department is increasing rapidly, although there are still gaps and weaknesses in the territory it covers. We are tremendously grateful for the increased support we have had in the University budget, from the Ontario Hospital Services Commission, and from granting bodies. We still have to conduct our research in temporary quarters, scattered widely around the campus, and we are still lamentably short of many types of equipment. The

research gap has by no means been closed as far as we are concerned, but the progress made has been very heartening.

Planning activities, which have been in course since 1960, have reached a crucial stage. We are being forced to be definitive and final in some of our decisions, facing issues which are incredibly complex. There is no doubt that "communication" both within the Department and within the Faculty as a whole has reached a new dimension, which threatens to bring all ordinary work to a standstill! Plans are being examined and integrated in a way never accomplished before and dispositions may have to be made which may limit our future mobility in a most uncomfortable way. New facilities are in mind at all the teaching hospitals. The acquisition of Sunnybrook Hospital has necessitated the transformation of a veterans' hospital into both a community hospital and a teaching hospital—operations which at first seemed to require to be carried out seriatim, but which now appear on the way to a simultaneous solution. The opening of new facilities at the Wellesley Hospital has added tremendously to our potential in the study of rheumatic diseases and certain aspects of endocrinology and dermatology. Similarily new facilities at St. Michael's Hospital, the Toronto General Hospital, and the Princess Margaret Hospital serve to encourage the members of planning committees at all the hospitals and at the Faculty level who have contributed so many hours to the task of recommending new expansion. The prospect of the future leaves one alternating between elation and panic. In spite of all the support which is rendered by dedicated members of the Department, the role and function of the departmental chairman is becoming more and more difficult to define and discharge. Some thought has already been given to this matter, and further developments on the organizational side will undoubtedly take place. None the less a lively spirit is abroad and most people are looking forward optimistically to the interesting days ahead.

With the extension of the retirement age to 65, we have been spared a large number of retirements, although Dr. K. D. McEachern has submitted his resignation from the Medical Outpatients Department at the Toronto General Hospital after 33 years of service there. A suitable tribute was paid to him at the departmental dinner on June 6. We have to report with sincere sorrow the death of Dr. Charles J. Bardawill, who served faithfully many years at St. Michael's Hospital, with a special interest in cancer. We must anticipate further losses to the new community hospitals which are developing in the city. Several members of staff have already accepted responsible positions in these institutions, which will be taken up in the near future.

In the past year, 22 staff appointments were given to men working in the Outpatients Department and General Practice Clinics in the various teaching hospitals. In addition there were 26 new recruits to the Indoor Services of these hospitals. Dr. J. R. Hilliard was appointed to supervise the Postgraduate Training Programme in the Department and has also been very helpful in many other aspects of administration. Professor E. F. Brooks has been asked to assume Chairmanship of a Committee on Examinations and Promotion Policies. Mr. William Oxley as the Business Officer continues to administer our expanding resources and monitor grant applications and so forth. The secretarial staff has been particularly busy because of the activities of the Curriculum Committee at the beginning of the year. I am grateful to all these people, and to the members of the Department in general, for their continued support, loyalty, and forbearance in the face of many frustrations and unsolved problems.

DIVISION OF THERAPEUTICS

Reported by Professor W. T. W. Clarke

The Department of Therapeutics has become a division of the Department of Medicine.

The addition of two experienced clinical pharmacologists with joint appointments in Pharmacology represents a welcome major innovation. Professor W. Mahon's

clinical work is centred in the Toronto General Hospital, and Professor T. Zsoter's in the Toronto Western Hospital. It is hoped that similar appointments can be made at St. Michael's and Sunnybrook. They have arranged most of the final year clinical-pharmacological conferences, though special visitors from Pharmacology have also come. There have been two staff men and one resident, and at times four or five doctors, at these conferences. An effort was made to involve the students in the discussion of the management of patients. Attendance again was variable but it is hoped that with more experience on the part of the staff, and with students who have more experience with conference-type teaching, these can be made to fulfill their promise.

The third year weekly lectures paralleled the lectures in Medicine and an attempt to correlate the teaching was made. Other members of the Department of Medicine assisted. The weekly theatre clinics, based on a case presentation and written up by the students, appear to be more effective than lectures with regard to both decision-making and patient orientation.

The Division of Therapeutics has acted for the Department of Medicine on the Sub-committee on Human Experimentation of the Research Board, Department of Research Administration.

The Director of the Division is responsible for the Kidney (dialysis) Unit in the Toronto General Hospital. The first patient reached two years of successful dialysis and rehabilitation to his professional work. New quarters are under construction in the Toronto General Hospital to expand the Chronic Dialysis facilities. It is increasingly apparent that renal transplantation is needed and plans are nearly completed to commence this.

There have been many visits from physicians, nurses, and technicians from other units. Some have worked on our unit as training in preparation for setting up new units.

Visitors

Visitors included Dr. D. O. Anderson, Vancouver, British Columbia; Dr. A. Angel, Montreal, Quebec; Dr. C. Aring, Cincinnati, Ohio; Dr. L. F. Belanger, Ottawa, Ontario; Dr. R. Borth, Geneva, Switzerland; Dr. K. Clark, St. Thomas, Ontario; Dr. A. J. Cooper, Timmins, Ontario; Dr. T. E. Cuddy, Winnipeg, Manitoba; Dr. J. V. Dacie, London, England; Dr. J. C. Dawson, Calgary, Alberta; Dr. J. Dickenson, London, England; Dr. M. Drury, England; Dr. L. Duncan, Edinburgh, Scotland; Dr. R. Fernando, Manila, Philippines; Dr. E. J. Freireich, Houston, Texas; Dr. P. Gautier-Smith, London, England; Dr. E. R. Giblett, Seattle, Washington; Dr. P. Heaton, Ottawa, Ontario; Dr. B. Hudson, Melbourne, Australia; Dr. N. C. Hughes-Jones, London, England; Dr. J. Huxley, London, England; Dr. K. N. Jeejeebhoy, Bombay, India; Dr. Thomas Killip III, New York, New York; Mrs. Langille, St. John's, Newfoundland; Dr. S. T. Laufer, Halifax, Nova Scotia; Dr. R. M. Little, Timmins, Ontario; Dr. I. Macdonald, London, England; Dr. R. Malmcrona, Gothenberg, Sweden; Dr. McGuinness, Glasgow, Scotland; Dr. J. G. Mills, Calgary, Alberta; Dr. J. C. Morgan, Calgary, Alberta; Dr. D. S. Munroe, Vancouver, British Columbia; Dr. D. Price, Berkeley, California; Dr. M. Read, Millbank Foundation; Dr. G. Rodnan, Pittsburgh, Pennsylvania; Dr. Roth, Washington, D.C.; Dr. D. F. Rovelli, Milan, Italy; Dr. Semple, Glasgow, Scotland; Dr. N. Sinclair, London, Ontario; Dr. S. Swisher, East Lansing, Michigan; Dr. M. F. Williams, Niagara Falls, Ontario; Dr. K. Winterhalter, Zurich, Switzerland; Dr. S. Worlledge, London, England; Dr. Zvaifler, Washington, D.C.

Honours

Dr. R. E. Alison, National Chairman, Education Committee of the Canadian Cancer Society. Dr. J. B. Armstrong, Governor for Ontario, American College of Cardiology; Honorary Secretary, National Executive of the Canadian Association for the Advancement of the Health Sciences. Dr. D. E. Bergsagel, Committee on

Fellowships and Scholarships, University of Toronto; Haematology Panel, Adverse Reaction Committee of the AMA, Council on Drugs; Chairman, Local Arrangements Committee, American Society of Haematology, Toronto meeting. Dr. R. Bladek, Guest Speaker, Annual Meeting, Victoria County Tuberculosis and Health Association. Dr. B. Charles, Fellowship, American College of Physicians. Dr. J. H. Crookston, William Goldie Prize; Counsellor, International Society of Blood Transfusion; Member, Managing Board, International Committee for Standardization in Haematology. Dr. S. Dubiski, Member, Canadian Society for Immunology and Ontario Antibody Club. Dr. H. J. Dworkin, Visiting Professor, St. Elizabeth Hospital, Youngstown, Ohio. Dr. F. B. Fallis, Medical Committee Chairman, Bolton Camp; Vice-chairman of Metropolitan Toronto Chapter of the College of General Practice. Dr. G. G. Forstner, Elected, Canadian Society for Clinical Investigation. Dr. D. A. Gordon, Visiting Lecturer, Postgraduate Course on Rheumatic Diseases, Dalhousie University; National Medical and Scientific Committee of the Canadian Arthritis and Rheumatism Society; Secretary-treasurer and Member of Council of the Clinical Research Society of Toronto; Deputy Chairman of the Medical Advisory Council of the Ontario Division of the Canadian Arthritis and Rheumatism Society. Dr. W. F. Greenwood, Chairman of the Medical Committee of the Ontario Heart Foundation. Dr. H. F. Haberman, Secretary, Dermatology Section, Academy of Medicine. Dr. G. D. Hart, Chairman, Section of Haematology, Ontario Medical Association; Guest Lecturer, Ontario Society of Medical Technologists Convention, Toronto. Dr. R. I. Hector, Vice-Chairman, Section of Psychiatry, Ontario Medical Association; Chairman, Co-ordinating Committee of the Committee of the General Hospital Psychiatrists. Dr. H. P. M. Higgins, Fellow, American College of Physicians. Dr. W. J. Hogarth, Past President, Ontario Federation of Medical Women; Chairman, Nominating Committee for the Federation of Medical Woman; President-elect, Canadian Federation of Medical Women. Dr. J. C. Laidlaw, Visiting Professor, Dalhousie University; Honorary Secretary-treasurer, Medical Society, University of Toronto. Dr. J. A. Little, Chairman, Ontario Heart Foundation Scientific Advisory Committee on Atherosclerosis; President, Toronto Diabetes Society; Member, American Heart Association; Member, American Diabetes Association. Dr. E. A. McCulloch, Visiting Professor, Middlesex Hospital and Medical School, London; Member, Program Committee of the American Association for Cancer Research. Dr. W. J. McIlroy, Secretary, Medical Advisory Board of the Multiple Sclerosis Society of Canada. Dr. J. E. Morch, Elected Member of the Canadian Cardiovascular Society. Dr. M. A. Ogryzlo, Chairman, Medical Advisory Board, and Chairman, Committee on Research and Education, Canadian Arthritis and Rheumatism Society; Wallace Graham Memorial Lecture, University of Western Ontario. Dr. J. F. Paterson, Member, Management Committee of the Canadian Tuberculosis Association. Dr. J. C. Richardson, Specialty Committee in Neurology, Royal College of Physicians and Surgeons of Canada. Dr. P. S. Rosen, Chairman of Medical Advisory Board, Ontario Division of Canadian Arthritis and Rheumatism Society; Secretary-treasurer, Canadian Rheumatism Association. Dr. E. J. Rzadki, Secretary, Section of Psychiatry, Academy of Medicine. Dr. D. Schatz, Chairman, Medical Section, Academy of Medicine. Dr. J. W. Scott, Treasurer, Academy of Medicine. Dr. A. Rapoport, Associate Editor, *Metabolism*. Dr. J. G. Scott, Member, Canadian Immunology Society. Dr. L. P. Solursh, Guest Speaker, Maimonides Medical Society; Guest Speaker, Lady Reading Society (law); Guest Speaker, Toronto Group, E.E.G. Technicians. Dr. G. Steiner, Member, Canadian Society for Clinical Investigation. Dr. D. A. Stinson, Member, National Scientific Advisory Council of Canadian Mental Health Association. Dr. M. Tyndel, Elected to Research Advisory Board, Institute for the Study of Drug Addiction. Dr. R. Volpé, Programme Committee of the American Thyroid Association. Dr. P. G. Walfish, Fellow, American College of Physicians; President, Clinical Research Society of Toronto. Dr. J. R. Wherrett, Member, Canadian Neurological Society. Dr.

K. J. R. Wightman, Councillor, American Clinical and Climatological Association. Dr. E. D. Wigle, Chairman, Medical Committee for Medical Research Council Survey of Medical Research in Canada. Dr. C. R. Woolf, Guest Lecturer, Kirkland and District Postgraduate Day, Kirkland Lake; Committee on Inhalation Therapy, American College of Chest Physicians; Secretary, International Committee on Medical Bio-electronics, American College of Chest Physicians. Dr. E. R. Yendt, Elected to Council, Canadian Society of Nephrology.

Scholarly Addresses

Dr. H. E. Aldridge, Royal College of Physicians and Surgeons of Canada, Ottawa, Ontario. Dr. J. B. Armstrong, Canadian Public Health Association Annual Meeting, Ottawa, Ontario; Conference on Teaching in Cardiology, Queen's University, Kingston, Ontario. Dr. P. Auger, Royal College of Physicians and Surgeons of Canada, Ottawa, Ontario; 39th Annual Session of the American Heart Association, New York, N.Y.; Congrès de l'Association des Médecins de langue française du Canada, Québec, Qué. Dr. E. F. Baker, Health League of Canada, Voluntary Committee on Health of the Senate and House of Commons. Dr. H. J. M. Barnett, Royal College of Physicians and Surgeons of Canada, Ottawa, Ontario. Dr. D. E. Bergsagel, Clinical Conference on Leukemia, Ontario Cancer Treatment and Research Foundation, London, Ontario; Lymphoma Task Force Meeting, N.C.I., Bethesda, Maryland; Chronic Leukemia-Myeloma Task Force Meeting, Bethesda, Maryland; National Defence Medical Centre, Ottawa, Ontario. Dr. P. Brawley, Third Year Psychology Seminar, York University, Toronto, Ontario. Dr. I. Broder, Ontario Allergy Society, Toronto, Ontario; Ontario Antibody Club, Toronto, Ontario; Ontario Veterinary College, Guelph, Ontario; Canadian Society for Clinical Investigation, Ottawa, Ontario; American Association of Immunologists, Chicago, Illinois. Dr. K. W. G. Brown, New York Heart Association, Syracuse, New York; Canadian Cardiovascular Society, Calgary, Alberta; Toronto Retail Pharmacists' Association, Toronto; Academy of Medicine, Hamilton, Ontario; Symposium of Ischaemic Heart Disease, Warner-Lambert Research Institute, Sheridan Park, Ontario; American College of Cardiology, Washington, D.C.; American Medical Association, Annual Convention, Chicago, Illinois. Dr. D. Cappon, IV World Congress of Psychiatry, Madrid, Spain. Dr. W. T. W. Clarke, Kellogg Clinic, Kirkland Lake, Ontario; Toronto Retail Pharmacists' Association, Toronto, Ontario; District of the Ontario Medical Association, Sault Ste Marie, Ontario.

Dr. M. Cohanim, American Association of Clinical Chemists, Upstate New York, N.Y. Dr. J. H. Crookston, XI Congress of International Societies of Haematology, Sydney, Australia; Ontario Antibody Club, Toronto, Ontario; Ontario Society of Medical Technology, Toronto, Ontario. Dr. J. K. Davidson, Georgia Diabetes Association, Atlanta, Georgia. Dr. G. De Veber, Royal College of Physicians and Surgeons of Canada, Ottawa, Ontario; Ontario Diabetic Association, Ontario Hospitals Convention, Toronto, Ontario. Dr. S. Dubiski, National Institutes of Health, Bethesda, Maryland; University of Chicago, Chicago, Illinois; University of Minneapolis, Minnesota. Dr. H. J. Dworkin, 14th Annual Meeting of the Society of Nuclear Medicine, Seattle, Washington. Dr. C. Ezrin, Royal College of Physicians and Surgeons of Canada, Ottawa, Ontario. Dr. G. G. Forstner, American Society for Cell Biology, Houston, Texas; Federation of American Societies for Experimental Biology, 51st Annual Meeting. Dr. W. H. Francombe, Ontario Antibody Club; Ontario Society of Medical Technology, Toronto, Ontario. Dr. D. Gordon, Rheumatic Diseases Postgraduate Course, Dalhousie University, Halifax, N.S.; Canadian Rheumatism Association, Annual Meeting, Edmonton, Alberta.

Dr. G. D. Hart, Royal College of Physicians & Surgeons of Canada, Regional Meeting, Sudbury, Ontario. Dr. R. Hasselback, Clinical Conference on Leukemia, London Clinic, London, Ontario; Queen's University, Kingston, Ontario; Ontario Hospital Association/Ontario Society of Medical Technology, Toronto, Ontario.

Dr. R. Herst, Canadian Hemophilia Society, Toronto, Ontario; Technician Training School, Toronto, Ontario; Ontario Society of Medical Technology, Toronto, Ontario. Dr. C. Hetenyi, Canadian Association of Gastroenterology, Quebec City, P.Q. Dr. H. P. M. Higgins, Royal College of Physicians and Surgeons of Canada, Ottawa, Ontario; American College of Physicians and Surgeons, Montreal, P.Q.; Medical Association of Jamaica, Kingston, Jamaica. Dr. D. E. Hill, Royal College of Physicians and Surgeons of Canada, Ottawa, Ontario. Dr. M. Hill, Canadian Neurological Society, Toronto, Ontario. Dr. J. B. Houpt, Royal College of Physicians and Surgeons of Canada, Ottawa, Ontario. Dr. J. R. Hilliard, Postgraduate Course in Clinical Haematology, Banff, Alberta. Dr. J. G. Humphrey, Royal College of Physicians and Surgeons of Canada, Ottawa, Ontario; First Canadian Congress of Neurological Sciences, Toronto, Ontario. Dr. M. D. Johnson, Royal College of Physicians and Surgeons of Canada, Ottawa, Ontario. Dr. J. C. Laidlaw, Royal College of Physicians and Surgeons of Canada, Ottawa, Ontario; Ontario Medical Association Meeting, Toronto, Ontario; Harvard Medical School, Boston, Mass. Dr. D. C. Ley, Ontario Association of Pathologists, Annual Meeting, Hamilton, Ontario. Dr. J. A. Little, Royal College of Physicians and Surgeons of Canada, Ottawa, Ontario; Guy's Hospital Medical School, London, England; International Symposium on Physical Activity and Cardiovascular Health, Toronto, Ontario; International Congress of Nutrition, Hamburg, Germany; Canadian Foundation for the Advancement of Therapeutics, Ste-Adèle en Haut, Québec; Canadian Society for Clinical Investigation, Ottawa, Ontario; Annual Meeting, of Ontario Association of Pathologists, Toronto, Ontario; Ischemic Heart Disease Symposium, Warner-Lambert Research Institute, Sheridan Park, Ontario; Workshop on Diabetes, Hoechst Pharmaceuticals, Quebec, P.Q.

Dr. R. L. MacMillan, International Congress of Haematology, Sidney, Australia; Symposium on Ischaemic Heart Disease, Werner-Lambert Research Institute, Sheridan Park, Ontario. Dr. Y. Marquis, 39th Annual Session of American Heart Association, New York, N.Y.; Royal College of Physicians and Surgeons of Canada, Ottawa, Ontario. Dr. D. McCarthy, Conference on Documentation in Rheumatic Diseases, Toronto, Ontario. Dr. E. A. McCulloch, McMaster University, Hamilton, Ontario. Dr. W. J. McIlroy, Multiple Sclerosis Society of Canada, Windsor, London, Port Arthur, Ontario. Dr. J. W. Meakin, Royal College of Physicians and Surgeons of Canada, Ottawa, Ontario. Dr. J. E. Morch, Royal College of Physicians and Surgeons of Canada, Ottawa, Ontario; Clinical Research Society, Joint Meeting, Toronto, Ontario; University of Alberta, Edmonton, Alberta; St. Catharines General Hospital, St. Catharines, Ontario.

Dr. M. A. Ogryzlo, Royal College of Physicians and Surgeons of Canada, Ottawa, Ontario; Pennsylvania Medical Society, Pittsburgh, Pennsylvania; Canadian Medical Association Annual Meeting, Saskatchewan Division; Southwestern Ontario Society of Internists, London, Ontario; Canadian Rheumatism Association, Edmonton, Alberta; University of Saskatchewan, Saskatoon, Saskatchewan; Interim Session of American Rheumatism Association, Cincinnati, Ohio; Edinburgh Postgraduate School and Pfizer Foundation Symposium on Rheumatic Diseases, Edinburgh, U.K.; Ontario Medical Association Meeting, Toronto, Ontario. Dr. D. Osoba, Gordon Research Conference on Cell Structure and Metabolism, Kimball Union Academy, Meriden, N.H.; Salk Institute for Biological Studies, La Jolla, California; Leucocyte Culture Conference, Montreal, P.Q.; Ontario Antibody Club, Toronto, Ontario. Dr. R. L. Perkins, Alexandra Park Housing Development, Toronto, Ontario; St. Christopher House, Toronto, Ontario. Dr. R. Pos, Canadian Psychiatric Association, Edmonton, Alberta; Brain Research Institute, University of Los Angeles; Neuropsychiatric Institute, University of Los Angeles, Los Angeles, California.

Dr. A. Rapoport, Royal College of Physicians and Surgeons of Canada, Ottawa, Ontario; Manitoba Medical Association, Winnipeg, Manitoba; Upstate New York Section of American Association of Clinical Chemists, Toronto, Ontario; National

Defence Medical Centre, Ottawa, Ontario; Clinical Day in Medicine, Saint John, New Brunswick; Canadian Urological Association, Montreal, P.Q. Dr. F. Rosen, Royal College of Physicians and Surgeons of Canada, Ottawa, Ontario. Dr. D. Schatz, Canadian Society for Clinical Investigation, Ottawa, Ontario. Dr. J. G. Scott, Ontario Society of Medical Technology, Toronto, Ontario; Ontario Pathology Association Refresher Course, Toronto, Ontario. Dr. D. Stinson, Welland County Medical Association. Dr. J. Suero, Royal College of Physicians and Surgeons of Canada, Ottawa, Ontario; Ontario Thoracic Society, Toronto, Ontario; Toronto Gas Club, Toronto, Ontario. Dr. O. F. Veidlinger, Canadian Congress of Neurological Sciences, Toronto, Ontario. Dr. R. Volpe, Royal College of Physicians and Surgeons of Canada, Ottawa, Ontario; Canadian Society for Clinical Investigation, Ottawa, Ontario; American Thyroid Association, Chicago, Illinois; Western Immunology Club, London, Ontario; McGill University, Montreal, P.Q.

Dr. P. G. Walfish, Royal College of Physicians and Surgeons of Canada, Ottawa, Ontario; Toronto Diabetes Association Meeting, Toronto, Ontario; New York Academy of Science Symposium on Diazoxide, New York, N.Y.; Canadian Society for Clinical Investigation, Ottawa, Ontario. Dr. D. L. Watt, Royal College of Physicians and Surgeons of Canada, Ottawa, Ontario. Dr. J. R. Wherrett, Canadian Congress of Neurology, Toronto, Ontario; Royal College of Physicians and Surgeons of Canada, Ottawa; Canadian Society for Clinical Investigation, Ottawa, Ontario. Dr. K. J. R. Wightman, Canadian Foundation for the Advancement of Therapeutics; Ste-Adèle Panel, Ste-Adèle, Québec; Clinical Day, Sault Ste Marie, Ontario; Symposium on Drug Costs, McGill University, Montreal, Quebec; Canadian Society Chemotherapy, Ottawa, Ontario. Dr. E. D. Wigle, Royal College of Physicians and Surgeons of Canada, Ottawa, Ontario; 39th Annual Session of American Heart Association, New York, New York; International Symposium on Physical Activity in Cardiovascular Health, Toronto, Ontario; Congrès de l'Association des Médecins de langue française du Canada, Québec, Qué.; American College of Cardiology, Washington, D.C.; International Symposium on "Electrical Activity of the Heart," London, Ontario; Canadian Cardiovascular Society, Calgary, Alberta; Canadian Radiological Society, Toronto, Ontario; Canadian Society for Clinical Investigation, Ottawa, Ontario. Dr. C. R. Woolf, Royal College of Physicians and Surgeons of Canada, Ottawa, Ontario; IXth International Congress of Diseases of the Chest, Copenhagen, Denmark; Ontario Thoracic Society Annual Meeting, Toronto, Ontario; American Medical Association Research Foundation, Colorado Springs, Colorado; Intensive Education Program for Public Health Nurses, Toronto, Ontario. Dr. E. R. Yendt, Royal College of Physicians and Surgeons of Canada, Ottawa, Ontario; Centennial Convention, St. Paul's Hospital, Saskatoon, Saskatchewan; Wellington County Medical Society, St. Joseph's Hospital, Guelph, Ontario; Upstate New York Section, American Association of Clinical Chemists, Toronto, Ontario; Canadian Society of Radiologists, Toronto, Ontario. Dr. T. T. Zsoter, Canadian Cardiovascular Society, Calgary, Alberta; American Heart Association Meeting, New York, N.Y.

Research

Allergy Immunology

Dr. I. Broder (TWH) has been studying the mechanism of anaphylaxis in the guinea pig, the role of soluble antigen-antibody complexes in human and animal diseases (collaboration with Drs. R. Baumal, J. Reynolds, D. Gordon, D. Bell of Toronto and Dr. L. Karstad of Guelph) and the role of gamma E and gamma G antibodies in human atopic disease (collaboration with Dr. H. Elder). Dr. D. Osoba (PMH) is pursuing studies to find an assay method for the humoral thymic factor which restores immune reactivity in neonatally thymectomized mice. Dr. R. Bladek (TWH) is continuing a study on allergy to insects. Dr. S. Dubiski (TWH) is carrying out research primarily concerned with the structure and synthesis of immunoglobulins

and antibodies based on allotypic specificities. Some of these studies have been conducted in co-operation with Dr. B. Cinader and Dr. Chi-Tao Chou of the Ontario Cancer Institute.

Cardiovascular

Dr. A. J. Kerwin (TWH) is experimenting with telemetering methods, particularly for long-term taping and for intensive care areas. Also at the Toronto Western Hospital a number of studies have been carried out in the Cardiovascular Unit. These include: an evaluation of propanolol in the treatment of angina pectoris and resistant atrial fibrillation, an evaluation of different types of permanent pacemakers in the treatment of complete heart block, an evaluation of the angiotensin infusion test, and an assessment of ethacrynic acid. Drs. K. W. G. Brown and R. L. MacMillan (TGH) have completed a five-year study of the treatment of patients in a Coronary Unit. This approach to the management of acute myocardial infarction has been found to be beneficial. Recently they have also been assessing the value of a portable electrocardiographic tape recorder. Dr. J. E. Morch (TGH) has been using radioactive Xenon to assess the quantity of mitral and aortic regurgitation, and the mixing efficiency of the left ventricle. The hemodynamic and antiarrhythmic properties of Xylocaine have been studied. A survey of patients with ventricular septal defects is being conducted. Dr. E. J. Noble (TGH) is carrying out a review of cases of Sydenham's chorea seen in the hospital since 1949. Dr. E. D. Wigle (TGH) has carried out further investigation of the pathophysiology of muscular subaortic stenosis, sudden severe mitral insufficiency, and clinical pathological studies of elastic degenerative disease of the aorta and its main branches. Dr. L. Casella (SMH) has been studying clinical and electrocardiographic arrhythmias induced by digitalis. With the help of Dr. P. Forbath, a study of the effects of low molecular Dextran in shock is continuing.

Dermatology

Dr. Murray Williams (PMH) has continued his work on epithelial organ cultures of human skin to study keratinization. He has also been growing epidermal tissue infected with wart virus in organ culture. He has developed a wart virus vaccine which he hopes will prevent the developments of warts. Dr. H. A. Haberman (TWH) has been working on (1) the isolation and localization of specific proteins of psoriatic epidermis, (2) the effects of anti-mitotic agents on specific proteins of psoriatic epidermis, and (3) the effects of hormones on tyrosinase levels in melanoma. Dr. Donsky (TGH) is doing clinical studies on (1) the use of .2% fluocinolone cream in recalcitrant dermatoses, (2) griseofulvin therapy in psoriasis, (3) complamin therapy in vitiligo. Dr. A. L. Hudson (SMH) has been studying the effects of the treatment of dermatoses with steroid incorporated into an adhesive occlusive tape. Dr. H. C. Hair has continued his studies of the skin of geriatric patients to determine the normal patterns and frequency of pathological lesions.

Endocrinology

Dr. H. P. M. Higgins (SMH) is continuing his studies of toxic goitre and thyroiditis. Work is also continuing on the metabolic effect of thyroxine in patients who have varying levels of thyroxine binding globulin. In conjunction with Dr. William Horsey and Dr. Bruce Stewart, he is evaluating the use of the Gamma Camera and Technectium 99M in the detection of lesions of the brain. The use of the Gamma Camera in the scanning of the liver, lung, and kidneys is also being assessed. Dr. D. W. Killinger (WH) has established a steroid research laboratory and has begun studies on the biosynthesis of adrenal steroids using a homogenate of hyperplastic, human adrenal tissue. The aim of these studies is to determine the metabolic fate of sulphate conjugate synthesized by the adrenal gland. Clinical studies are also being carried out on patients with virilizing adrenal hyperplasia as part of a project to determine if conjugation within the adrenal gland is a factor in the development

of virilization. Dr. R. H. Sheppard and Dr. D. L. Schatz (TWH) have studied changes in thyroid function during fasting. A study was also completed correlating changes in radiologic skin thickness in acromegaly with serum growth hormone levels. Dr. D. L. Schatz also investigated (1) the diurnal variation of serum-free thyroxine and thyroxine binding proteins in normal individuals, hyperthyroid and hypothyroid patients, and euthyroid patients with other diseases, (2) thyroid function in subjects receiving oral contraceptive therapy, and (3) the effects of certain drugs such as Propanolol, Reserpine, and Nilevar on thyroid function. Dr. R. Volpe (WH) and Dr. C. Ezrin (TGH) have been carrying out studies on the plasma binding of thyroid hormones. Dr. Volpe in addition has been studying (1) the rapidity of increase in thyroxine binding globulin with large doses of oestrogen, (2) the effect of total thyroid ablation with regard to the subsequent levels of conventional thyroid auto-antibodies and LATS, and (3) the effects on the pattern of iodinated compounds in the plasma following maximal stimulation of the thyroid gland with exogenous pituitary thyrotrophin. Dr. J. C. Laidlaw (TGH) in association with Dr. I. Salti and Dr. T. Chremos has been studying the production of corticosterone in patients with hypertension. The study of the new syndrome Dexamethasone-remediable hypertension and the work on the mechanism of action of heparin-like compounds on the adrenal cortex is being continued. Dr. J. L. Ruse is investigating the metabolism of 16αhydroxylated steroids.

Gastroenterology

Dr. S. V. Feinman (NMSH) has continued studies of the clinical application of peritoneoscopy-guided liver biopsy and intraperitoneal colour photography. A pilot study was conducted of the amino acids in gastric juice. Methods of estimating bile acids in bile and in plasma were studied with the use of thin layer-and gas-chromatography. He is at present studying proteins, amino acids, and lipoproteins in bile of humans and rabbits with toxic cholangitis, hepatocellular injury, and during gallstone formation. Parallel studies are also being done on bile of normal humans and patients with gallstones. Dr. Caroline Hetenyi (WCH) has been studying pancreatic function. Se 75 Selenomethionine is incorporated into pancreatic juice protein in normals and patients with diseases of the pancreas. The results are correlated with pancreatic enzymes in duodenal juice and serum. Dr. Jean Hogarth (TWH) and Dr. D. Ley have completed a study of iron kinetics in chronic liver disease. Dr. G. G. Forstner (TWH) has been studying the structure and function of the small intestinal microvillar membrane. Dr. J. R. Bingham (TWH) in association with Dr. V. Aynaciyan has continued his research on gastroduodenal physiology. These studies have included (1) the normal pH of the duodenum and its derangement in patients with duodenal ulcer, (2) the effects of the drugs dicyclomine, glycopyrrolate, and atropine on gastric secretion and emptying, and (3) the relationship between gastric secretion and gastric motility in man.

Haematology and Cancer Research

Dr. R. Alison (PMH) completed a study comparing nitrogen mustard to vinblastine sulphate in advanced Hodgkin's disease. A second study was carried out comparing prednisone and chlorambucil given singly to a combination of these drugs in patients with advanced lymphocytic disease. A co-operative study with a number of centres in the United States has been started to compare the effects of local radiation with regional radiation in patients with stage I and II Hodgkin's disease. Dr. D. Bergsagel (PMH) has continued his studies of immunoglobulin abnormalities of myeloma proteins. Studies are also continuing to determine the optimal therapy of cyclophosphamide in patients with lung cancer. Intensive combination therapy for acute leukemia using a combination of Vincristine, Amethopterin, and Cyclophosphamide was assessed. In addition to the above studies the growth characteristics of mouse plasma cell tumour Adj. PC-5 was studied. Because of its particular growth

characteristics, this tumour was found to be very sensitive to the action of cyclophosphamide. Dr. D. H. Cowan (TGH) has been mainly concerned with chemotherapy studies of malignant disease. A review of patients with acute leukemia during the period 1961–65 at the Toronto General Hospital, Princess Margaret Hospital, and Toronto East General Hospital was carried out by Dr. D. H. Cowan, Dr. R. Hasselback, and Dr. G. Hart. Dr. H. J. Dworkin (PMH) has carried out a number of studies involving radioactive isotopes. A new liver-scanning agent, technetium sulfide colloid, has been assessed. A study is in progress to examine the influx of potassium and rubidium into red blood cells. The hypocalcemic effect of a new chemotherapeutic agent, mithramycin, is being assessed. A study has been initiated to examine the radiation sensitivity of the mammalian thyroid gland, utilizing the mouse thyroid as a model. In addition, a family case study is in progress examining members of a family with the unusual combination of pheochromocytoma and thyroid carcinoma. Dr. G. D. Hart (TEGH) is carrying out studies on the prevention of Rh haemolytic disease in addition to drug trials in malignant disease. Dr. R. Hasselback (PMH) has been analysing chromosomes in a series of patients with hematopoietic malignancies. Dr. Hasselback is also active in various drug trials in malignant disease. Dr. D. Ley, Dr. S. Sekiguchi, (TWH) have studied platelet survival using chromium 51 in patients with malignant disease. Dr. Ley, Dr. Sekiguchi and Dr. G. A. DeVeber have collaborated on a project to determine the most compatible donors for kidney transplants using mixed lymphocyte cultures. Dr. J. G. Watt (TWH) in co-operation with Dr. S. Sekiguchi has carried out platelet survival studies on a selected group of patients with extensive psoriasis and thrombocytopenia. These patients have been found to respond poorly to steroid therapy but improve with immuno-suppressive agents. Dr. E. A. McCulloch and the Department of Medical Biophysics (PMH) have continued their studies of the regulation of cellular proliferation and differentiation in the hemopoietic and immune systems. Dr. J. W. Meakin (PMH) in co-operation with Dr. B. Cinader is continuing to test the effects of immunization of cancer patients with diazotized extracts of their tumour. A study of the effect of ovarian irradiation and prednisone following mastectomy in patients with cancer of the breast is being carried out as well as a series of trials of chemotherapy. Dr. H. Meindok (TWH) has been active in the field of chemotherapy of malignant disease. Dr. D. Watt (TGH) has continued studies of possible hypercoagulable states using the "coagulation timer." Dr. G. Scott (TGH) is interested in the haemolytic mechanisms with particular reference to the action of antibodies and compliment on the red cell membrane. A family with an unusual inherited coagulation defect is being investigated. Dr. J. Crookston (TGH) continues studies of abnormal haemoglobins and thalmassemias and also antigens and antibodies of the Ii blood group system. Dr. R. Herst and Dr. J. Crookston are carrying out clinical trials of cyro precipitates and other A.H.G. concentrates in the treatment of haemophilia A, and factor IX concentrates in the treatment of haemophilia B. Dr. W. Francombe (TGH) is continuing studies of serum protein immuno electrophoresis.

Metabolism and Diabetes

Dr. W. R. Campbell has been working on methods to improve the determination of calcium and magnesium. Dr. J. Harrison (PMH) has been continuing her interest in calcium metabolism with particular respect to calcium kinetics. In co-operation with Dr. H. Barnett (TGH), studies have been carried out on patients who have received body burdens of thorotrast. Possible deleterious effects are being looked for as a result of radiation from the thorium. Dr. B. Hazlett and Dr. J. K. Davidson have been investigating the I-131-insulin plasma disappearance in insulin-treated diabetic patients. The procedure can be used to identify patients with increased serum insulin-binding capacity. The following research work has been done in the Clinical Investigation Unit at St. Michael's Hospital under the direction of Dr. J. A. Little. A patient with hereditary fructose intolerance and platelet disease was followed in co-operation with Dr. Fraser Mustard. A series of new diabetic patients are being investigated by

Dr. Norman Marcon with regard to the titre of insulin antibodies and the rate of insulin disappearance following treatment with lente and sulfated insulin. A sensitive test for plasma insulin antibodies is being developed by Mrs. M. Plautz. Dr. B. Birchwood, Dr. M. Antar, and Dr. Little have made controlled observations on the effect of tea and coffee on serum lipids in 28 coronary patients. Dr. Birchwood has completed a formula diet study, comparing the effect of 50% of calories as sugar or starch on the serum lipids of hyperlipidemic patients. A study of the fractionation of serum lipids and lipoproteins of hyperlipidemic patients using several procedures for the purpose of selecting the most practical and useful methods was completed. Dr. H. Shanoff and Dr. Little are writing papers on the relation of heart size and occupation to prognosis in survivors of myocardial infarction. Dr. J. Olin has organized a new acute medical unit for the Alcoholism and Drug Addiction Research Foundation located in Riverdale Hospital. This unit will be used mainly for research to establish a basic science in the field of alcoholism. Dr. P. G. Walfish (NMSH) is continuing his study on the mechanism of hyperglycemic action of Diazoxide. Work is also being done comparing the metabolic effect of D-Thyroxin with L-Thyroxin. Dr. E. R. Yendt (TGH) is pursuing the following investigations: (1) the effects of thiazides on calcium, phosphorous, and magnesium metabolism, (2) the study of the therapeutic value of thiazides in patients with recurrent renal calculi, (3) the effects of thiazides in patients with metabolic bone disease, (4) urinary excretion of hydroxyproline in patients with skeletal disorders, (5) a review of patients with primary hyperparathyroidism, (6) metabolic assessment of patients with recurrent renal calculi. Dr. G. Steiner (TGH) has been investigating the mechanisms of hyperlipemia and the metabolism of adipose tissue.

Neurology

Dr. H. Berry (SMH) has completed a clinical study of neurological, psychiatric, and social aspects of low back pain in the injured workman. He also has set up electrophysiologic facilities at St. Michael's Hospital for electromyography and for nerve conduction studies. Dr. M. Hill (TGH) is continuing clinical research in Parkinson's disease and other extra-pyramidal diseases. Dr. O. S. Kofman (NMSH) with the co-operation of Dr. R. R. Tasker of the Department of Neurosurgery has been interested in the subject of ipsilateral and inhibitory cerebral seizures. In addition, Dr. Kofman has completed a preliminary study of cerebral atrophy with reference to possible abnormalities of glucose metabolism. Dr. R. S. McPhedran (WH) has continued his research activities in the Department of Pathology at the Banting Institute dealing with the ultrastructural changes in Polymyositis. Dr. D. Crapper (TGH) recently installed a laboratory in the Best Institute and has begun electrophysiological studies. Recordings will be made from single nerve cells in normal and diseased states from various parts of the brain. Dr. J. R. Wherrett (TGH) continues work on the analysis of glycolipids in diseases of the nervous system. Dr. J. W. Scott (TGH) in association with the Department of Otolaryngology, has been establishing facilities for adult testing of hearing using Cortical Evoked Potential Audiometry. Dr. O. F. Veidlinger (WCH) has been carrying out research into Alzheimer's Neurofibrillary tangles with particular reference to the Parkinsonism-Dementia Complex. Dr. W. J. McIlroy (TWH) recently completed a clinical review of multiple sclerosis patients. Dr. R. H. Sheppard (TWH) in association with Dr. R. Fleming and Dr. C. Tator assessed cerebral spinal fluid scanning using I-131 labelled serum albumin. Dr. D. Wood in association with Dr. Crapper and Dr. K. Taylor have been studying methods of estimating cerebral blood flow using I-131 and wash-out curves using 133-xenon. Dr. J. G. Humphrey (TGH) is doing histological, histochemical, biochemical and electrophysiological studies of patients with neuromuscular disorders.

Psychiatry

Dr. E. F. W. Baker (TWH) has been conducting behavioural-physiological

investigation of manics, depressives, and normals. Dr. R. Pos (TGH) is conducting a major research project into the electro-physiology of informational underload (sensory deprivation). Dr. I. Hector (WH) is assessing behaviour therapy of obesity and is also carrying out a clinical drug study of parnate, valium, and placebo in the treatment of neurotic-depressive illness. Dr. L. P. Solursh (TWH) is investigating EEG conditioning effects of affective experience with LSD and examining LSD as a therapeutic adjuvant in the treatment of patients with markedly obsessional personality traits. Also being conducted is a survey of (1) Emergency Department patients with LSD intoxication and (2) attitudes of high school children to drug usage. Dr. M. Tyndel at the Alcoholism and Drug Addiction Research Foundation has been carrying out a number of research projects having to do with alcoholism. Dr. A. Walters (TGH) has continued clinical studies of cases of psychogenic regional pain.

Renal Disease

Dr. F. M. Hill and Dr. M. Robertson (WCH) have been studying bacteriuria in patients in the general practice and prenatal clinics. Dr. F. M. Hill and Dr. M. Johnson have compared blood and urine levels of Hetacillin in patients with urinary tract infections and control patients without infection. Dr. E. R. Yendt (TGH) has been carrying out a number of investigative projects concerned with metabolism and renal disease. Many of these have been listed under metabolism. Metabolic assessment of patients with recurrent renal calculi and investigation of renal tubular disorders are continuing. Dr. A. Rapoport (TWH) and Dr. H. Husdan, Department of Biochemistry, have completed a comparative study of three different methods of measuring serum and urine creatinine. Different methods of estimating glomerular filtration were also studied. In co-operation with Drs. D. R. Wilson and G. N. Ranking a study of the effect of prolonged renal artery stenosis on hypertension and the function of renal collateral circulation in the dog was completed. Focal proliferative glomerulonephritis was investigated with the co-operation of Drs. G. DeVeber, G. N. Ranking, and C. R. McLean. A clinical study of the effects of cyclophosphamide in patients with nephrotic syndrome and glomerulonephritis not responding to steroid therapy was completed with the co-operation of Dr. G. DeVeber. Dr. M. Cohanim (TGH) has been investigating the relationship between plasma renin and hypertension, the change in plasma renin and aldosterone secretion rate during the menstrual cycle, and the effect of thiazide on plasma renin.

Respiratory

Dr. C. R. Woolf is studying a variety of problems in the Cardiorespiratory Laboratory at the Toronto General Hospital. The two major projects include a study of (1) the respiratory effects of regular cigarette smoking in women and (2) the surgical treatment of emphysema. Short-term projects include a study of (1) the regulation of respiration by oxygen tension oscillations in arterial blood, (2) the differentiation between small and large airway obstruction using the body plethysmograph, (3) the value of flow volume loops during coughing and the assessment of obstruction to air flow, (4) an attempt to obtain more reproducible steady-state diffusing capacity results using a breathing simulator, and (5) computer programming in a Respiratory Function Laboratory. In co-operation with Dr. D. E. Wood studies of respiratory function are being undertaken using various radioactive isotopes.

Rehabilitation

Dr. R. E. Renaud (TWH) has been studying post-prostatectomy incontinence.

Rheumatology

The University of Toronto Rheumatic Disease Unit with its associated research laboratories has been established in the Wellesley Hospital within the last year. This unit has been under the direction of Dr. M. A. Ogryzlo whose research activities have included (1) the effect of allopurinal on the treatment of gout and other metabolic

disorders (collaboration with Dr. Houpt), (2) Tryptophan metabolism and its metabolites (collaboration Dr. J. Houpt), (3) immunoglobulin characterization and quantitation (collaboration Dr. D. Gordon and Dr. W. Pruzanski), (4) L.E. phenomenon and antinuclear factors by indirect immunofluorescent staining, (5) characterization and incidence of nasal lesions in rheumatoid arthritis and the collagen diseases, and (6) a clinical pathologic study of lupoidhepatitis (collaboration Dr. W. J. Reynolds). Dr. D. Gordon (WH) has been investigating immunoglobulin and microbiological aspects of rheumatic disease and has also been concerned with the development of documentation methods. The research activities of Dr. W. J. Reynolds (TWH) include (1) a study of the metabolism of rheumatoid factor (collaboration Dr. I. Broder), (2) follow-up of several patients with lupoid hepatitis, (3) the establishment of a documentation programme for a Rheumatic Disease Unit at the Toronto Western Hospital, and (4) the initiation of a prospective study of the natural history of hand deformities in rheumatoid arthritis. Dr. M. Pflug (TGH) is beginning a long-term study of patients with rheumatoid arthritis. Dr. D. McCarthy (TGH) in association with Dr. R. W. Jackson of the Department of Orthopaedic Surgery is establishing a programme to evaluate the use of the arthroscope.

Family Practice Units

Within the past year, Family Practice Units have been established at the Toronto Western Hospital, Toronto General Hospital, and the Wellesley Hospital. These units in addition to their service and teaching function are planning the following research projects. Dr. F. Fallis (TGH) is working on a survey of Papinicolum Smears in general practice and the reliability of Dextrostix in office practice. The Family Practice Unit at the Toronto Western Hospital under the direction of Dr. R. Perkin has undertaken a study of acute upper respiratory infection, specifically focusing on the question of whether or not the physician can distinguish clinically between bacterial and viral upper respiratory infection and thereby decide whether to give the patient antibiotics. The Family Practice Unit at the Wellesley Hospital is beginning a study of the effect of long-term cigarette smoking.

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OBSTETRICS AND GYNAECOLOGY

Under the direction of Professor W. M. Paul

The past year has involved many members of the Department in an active role in planning for the proposed expansion of undergraduate medical registration. These studies have been related to a new clinical curriculum as well as the facilities, both clinical and research, to support modern medical education. It is apparent that new teaching techniques must be realistically evaluated and that the clinical teachers will be increasingly involved in these activities. Evaluation of undergraduate performance by objective methods was initially utilized and the correlated results merit its extension.

Postgraduate education continues to attract applicants of high calibre. Doctors J. R. Dowd, M. J. Farrell, E. J. Istvan, V. B. Kurdyak, R. L. McBride, and D. J. McDonald obtained their Fellowship in the Royal College of Surgeons of Canada. Dr. McBride is returning to Edmonton to participate in the Department of Obstetrics and Gynaecology of the University of Alberta.

In the area of continuing education, refresher courses were held for general practitioners in November and January and for specialists in February.

Dr. W. M. Paul was a Visiting Professor at Lakehead University, Port Arthur, in September.

The Department welcomes Dr. C. A. Woolever as Chief of Obstetrics and Gynaecology at St. Michael's Hospital with the rank of Professor. Dr. Woolever's interests in teaching and research will contribute significantly to the strength of the Department. These merits are recognized in his appointment as Period Chairman for the System on Reproduction and Neonatology in the Clinical Curriculum.

Dr. W. J. Hannah was appointed Chief of Obstetrics and Gynaecology at the Women's College Hospital, with the rank of Assistant Professor. His abilities in administration and teaching are duly appreciated.

Dr. G. Urbach has returned to the Wellesley Hospital to continue his investigation in immunology related to Obstetrics and Gynaecology.

Dr. J. E. Morgan has returned to the Toronto General Hospital to assume his duties as a Clinical Teacher and to further his investigation of the mechanism of urinary function.

Dr. J. W. Goodwin and Dr. J. E. Milligan are returning as Associates in the Department and to the staff of the Women's College Hospital. Both have been active in the research field of foetal physiology, Dr. Goodwin at the University of Alberta and Dr. Milligan at the Nuffield Foundation for Medical Research at Oxford, England.

Dr. D. J. Gare will join the staff as a Clinical Teacher at the Toronto General

Hospital where for the past year he has been conducting a study of foetal assessment, utilizing biochemical methods.

Dr. J. H. Whiteside is currently at Chapel Hill, North Carolina, extending his experience in the physiology of uterine activity prior to his return to this Department.

The Department was honoured by visits and academic presentations by Mr. G. W. Theobald, University College Hospital, London, England; Mr. David Millar, Newcastle-upon-Tyne, England; Mr. Richard Beard, Queen Charlotte Hospital, London, England; Professor C. H. Hendricks, Western Reserve University, Cleveland, Ohio; and Dr. Rudi Borth, Maternity Centre, Geneva, Switzerland.

The year has been one of achieving an expansion of our staff in the research and academic fields. Much basic work has been achieved in the planning of programmes and facilities for teaching, research and patient care. Much more remains to be accomplished.

The Head of the Department wishes to thank the members of the staff for their many efforts in these endeavours and to express his appreciation to Dean Chute for his continued support.

Honours

Doctor M. L. Bunker was appointed Vice-Chairman of the Medical Advisory Committee of the Canadian Cancer Society, Ontario Division.

Doctors J. E. Morgan and G. Urbach continued a McLaughlin Fellowship for study abroad.

Doctor J. E. Milligan continued a McLaughlin Fellowship for two years' study in England.

Doctor F. R. Papsin was elected to Fellowship in the American College of Obstetricians and Gynecologists.

Scholarly Addresses

Western Reserve University, Cleveland, Ohio, January, 1967, Jerome M. Rosenbloom Lecture: Dr. W. M. Paul, "Foetal Assessment."

Montreal Obstetrical and Gynaecological Society, Montreal, October, 1966: Dr. W. M. Paul, "Making Decisions."

American Gynecological Society, Phoenix, Arizona, May, 1967: Dr. W. M. Paul, "Clinical Assessment of Foetal Scalp Sampling."

Canadian Physiotherapy Association, Toronto, March, 1967: Dr. T. A. Doran, "Advances in Rh Iso-Immunization."

Canadian Public Health Association, Ottawa, April, 1967: Dr. R. Wilson, "Family Planning in a Co-ordinated Hospital and Community Health Setting."

University of Saskatchewan, Saskatoon, December, 1966: Dr. R. Wilson, "Utilization of Oestriols for the Assessment of the Foeto-Placental Unit Prior to the Onset of Labour."

Montana State Medical Association, Bozeman, Montana, September, 1966: Dr. C. A. Woolever, "The Stein Laventhal Syndrome: Results of Treatment"; "Infertility and Anovulation"; "Uterine Synechise."

The Society of Obstetricians and Gynaecologists of Canada, Murray Bay, Quebec, June, 1967: Dr. J. W. Goodwin, "The Impact of the Umbilical Circulation on the Foetus"; Dr. T. A. Doran, "An Endometrial Cytology Study in Asymptomatic Post-Menopausal Patients."

Research

Members of the staff have undertaken the following research activity.

Dr. T. A. Doran has continued his investigation of asymptomatic post-menopausal patients by cyto-vaginal studies as well as by endometrial lavage.

In addition, he has continued the evaluation of anti-Rh iso-immunized patients by amniocentesis and extended his experience of intraperitoneal transfusion in utero of the severely affected erythroblastotic infants. This work has been carried out at the Toronto General Hospital with the assistance of a Dominion Stores grant.

Dr. J. W. Millson and Mr. R. Roy of the Toronto Western Hospital are also continuing their study of the Rh-sensitized patients by amniocentesis and intrauterine transfusions.

Dr. C. P. Vernon has continued his assessment of the effects of chemotherapeutic agents in metastatic gynaecological malignant disease, including the use of progestational steroids in endometrial carcinoma. The study has been done at the Toronto General and Princess Margaret Hospitals.

Dr. J. E. Morgan is investigating the mechanisms of urinary bladder function and control in the female at the Toronto General Hospital.

Dr. C. S. Russell has continued his study of stress incontinence of urine as well as the evaluation of Teflon intrauterine devices at the Toronto Western Hospital.

At the Toronto General Hospital, clinical studies of foetal assessment during labour have been made. Dr. D. J. Gare has utilized the Saling technique of biochemical evaluation and Dr. L. Organ has been carrying out direct foetal electrocardiography.

At the Wellesley Hospital, Dr. G. Urbach has been investigating immunological reactions in obstetric and gynaecologic patients and Dr. T. G. Ryley has continued the study of abnormal chromosomal patterns with reference to aborted pregnancies.

The method developed by Drs. S. L. Cohen and R. Wilson for the rapid determination of oestrogens in pregnancy has been further refined. A precipitation technique eliminates sugar and other substances which interfere with assays in toxaemia and Rh iso-immunization. Enzyme inhibitors are also removed so that total oestrogen assays are more accurate. Work on oestrogen assays in urine of non-pregnant patients has also been extended. Progress has also been made on the separation of conjugated steroids by the use of a series of filtrations on various Sephedex gels.

Dr. J. A. Harper has investigated a smooth muscle relaxant in a double blind study of 200 primiparous patients in labour at St. Michael's Hospital. In addition, he has continued a study and evaluation of intraperitoneal infusions of antibiotic solutions in gynaecological peritonitis.

Publications

Apted, W. E. "The Management of Low Back Pain" (*Applied Therapeutics*, vol. 8, no. 11, Nov., 1966, pp. 948–1049).

Cohen, S. L. "A Method for the Rapid Colorimetric Assay of Total Estrins in Pregnancy Urine" (*Journal of Clinical Endocrinology and Metabolism*, vol. 26, no. 9, Sept., 1966, pp. 994–1004).

Goodwin, J. W., Mahon, W. A. and Paul, W. M. "Fetal Cardiac Output as Studied by Dye Dilution Technics, I. Physiology of the Fetal Circulation"; in *The Heart and Circulation in the Newborn and Infant*, by Donald E. Cassels, pp. 1–6. New York: Grune & Stratton. 1966.

Goodwin, J. W. and Paul, W. M. "Umbilical Arterial Oxygen Tension of the Fetal Lamb in Utero" (*American Journal of Obstetrics and Gynecology*, vol. 96, no. 3, Oct. 1, 1966, pp. 363–6).

Mahon, W. A., Goodwin, J. W. and Paul, W. M. "Measurement of Individual Ventricular Outputs in the Fetal Lamb by a Dye Dilution Technique" (*Circulation Research*, vol. 19, July, 1966, pp. 191–8).

Spivak, M. R. "Therapeutic Abortion" (*American Journal of Obstetrics and Gynecology*, vol. 97, no. 3, Feb. 1, 1967, pp. 316–22).

Urbach, G. and Cinader, B. "Hormonal Control of MuB1 Concentration" (*Proceedings of the Society for Experimental Biology and Medicine*, vol. 122, 1966, pp. 779–82).

Wilson, R., Bird, C. E., Wiqvist, N., Solomon, S. and Diczfalusy, E. "Metabolism of Progesterone by the Perfused Adrenalectomized Human Fetus" (*Journal of Clinical Endocrinology and Metabolism*, vol. 26, no. 10, Oct., 1966, pp. 1155–9).

OPHTHALMOLOGY

Under the direction of Professor Clement McCulloch

Undergraduate ophthalmic training is given to the third and fourth medical years. Dr. H. M. Macrae and Dr. L. A. Lloyd supervise the programme for the third year. This course is designed to help the students visualize the ocular fundus and to understand the pathologic changes that occur there. The teaching for the fourth clinical year is made up of lectures and clinics aimed to promote a better understanding of the specialty.

During this year extensive changes were made in the graduate teaching programme. The first year is spent in the laboratory. The teaching programme consists of a series of didactic lectures on basic science related to the specialty. The men also receive regular assignments from the Professor's office, which are marked and returned. They complete a research project during the year. The work from these projects is presented at the annual Research Meeting in competition for the John Gaby Prize and, if suitable, the papers are published in an ophthalmic journal. On the tenth of each month the men are given an examination on the work of the previous month, this being either of essay or of multiple-choice type. The service commitments of the first year men are minimal. The whole teaching staff of the Department participates in this programme.

In the second year the students work in the teaching hospitals as seniors. They also receive instruction and assignments and monthly examinations on medical ophthalmology.

The third year men have the responsibility of service in the teaching hospitals. They must allot schedules of work and see that it is carried through satisfactorily. They receive instruction in the surgery of the specialty and have monthly examinations. In the spring they give a clinical paper in competition for the Alumni Prize. Every operation done in the Department is personally supervised by a staff man.

In the first year the students are supported from sources outside the teaching hospitals; we are grateful for this assistance. Drs. P. D. Chubb and R. M. Gladstone, both of Toronto, are Canadian National Institute for the Blind Fellows, Dr. D. R. Smith of Montreal is a Fellow under a Provincial Health Grant and Dr. Marvin Cooper of Toronto is supported by the Defence Research Board of Canada.

The second year men rotating through the major teaching hospitals are Drs. F. Feldman, B. Craig, W. D. Allin, E. V. Rafuse, J. Cardarelli, and G. M. Somerville. Dr. B. Newbigin is a second year resident at Sunnybrook Hospital.

The third year men who are completing their training in the Department are Drs. D. H. Dickson, J. R. Miller, J. R. Elder, and J. E. Graham. Dr. J. K. Warnica is the final year resident at Sunnybrook Hospital.

Drs. G. M. Cobb, P. E. A. Hiscox, and J. J. Kazdan successfully passed the Fellowship examinations of the Royal College of Physicians and Surgeons of Canada modified for ophthalmology. Drs. J. A. Parker, R. L. Alexander, I. O. Drysdale, C. J. Radford, and D. M. Dorsey received Certificates from the Royal College.

Dr. John A. Parker has been a McLaughlin Fellow during the year, studying optical design at the Institute of Optics of the Univeristy of Rochester. He will return to the staff of the Toronto General Hospital. Dr. John R. Elder has received a McLaughlin Fellowship to study the theory and practice of strabismus, amblyopia, and orthoptics in Iowa, Washington, and San Francisco. After this advanced training he will return to the staff of the Hospital for Sick Children.

The Annual Eye Surgery Clinical Meeting was held March 13, 14, and 15 under the direction of Dr. H. M. Macrae. Eighteen of the staff of the Department contributed to the course. There were forty-six in attendance. Guests of honour were Mr. Dermot Pierse of London, England, and Dr. Marshall Parks of Washington. The two subjects that were stressed during the course were microsurgery and the surgery of squint. Demonstrations of surgical procedures in the operating room were put on.

Dr. John Hall described his experience with Medicare in Malaya, at the course banquet.

The Eighth Walter Wright Lectureship was held December 2. Dr. Wendell L. Hughes of New York, President of the American Academy of Ophthalmology and Otolaryngology, gave the Lecture on "Recent Improvements in Techniques of Ocular Surgery." The remainder of the day was given over to a clinical meeting. In total, twelve of the staff and two alumni presented papers.

An Ophthalmology Course for General Practitioners was given January 26 and 27, under the direction of Dr. G. A. Thompson. This followed a successful course in the previous year and was scheduled because of the obvious acceptance of such a course by general practitioners. As a result of previous experience considerable live material was shown and simple diagnostic techniques of ophthalmology and the management of treatment of diseases were stressed.

The Department also assisted the School of Nursing of the Toronto General Hospital in a three-day course in ophthalmology for graduate nurses. The contributions of the Eye Department consisted of a series of lectures and demonstrations by the staff in the basic concepts of the various ocular diseases. This material was designed to complement lectures on nursing procedures given by the teachers of the Nursing School.

Considerable effort went into putting on the Annual Research Day and the day of the opening of the new laboratories at 1 Spadina Crescent. Dr. K. C. Charron, Deputy Minister of Health for Ontario, cut the opening tape for the new laboratories April 28. Vice-President J. D. Hamilton and Dean A. L. Chute assisted with the ceremony. Following the opening ceremony there was a tour of the laboratories. The approximately three hundred people who attended were able to see twenty-two exhibits as well as demonstrations of the research work of the Department. Also on display were the various apparatus and procedures commonly used in the laboratory. For the three days following the opening, science classes from city schools were invited to make a tour of the laboratories. Our staff was on hand to explain the instruments and the work that is done in the various rooms.

The opening ceremony took place at the Connaught Building. The earlier part of the day was occupied with a clinical programme including ten papers given by the residents and staff. Dr. J. K. Warnica won the Alumni Prize for his paper on "Blow-out and Rim Wall Fractures of the Orbit." Dr. Francis Heed Adler, of Philadelphia, Secretary of the American Board of Ophthalmology, was the guest of honour and discussed a number of cases of marginal degeneration of the cornea. At the banquet in the evening, Dr. Adler spoke on problems concerning research in ophthalmology.

April 29 was devoted to the Ninth Annual Research Meeting. The guest of honour was Dr. John E. Harris, Professor of Ophthalmology at the University of Minnesota. He gave two papers discussing transport of fluid from the cornea and laboratory and clinical problems associated with therapeutic corneal grafts. Also present were Dr. Bernard Noell of Buffalo, who discussed retinal damage by light, and Drs. R. M. Reed and R. J. Rossiter of London, who discussed metabolism of phosphoinositides. Dr. J. A. Orpin of the Department of Otolaryngology described electronic techniques in visual research. Papers were given by the research staff and the first year Fellows. Dr. P. D. Chubb won the John Gaby Prize for his paper on "Factors Affecting the Determination of Scleral Rigidity."

The major item of Departmental activity during the year was the move to the ophthalmic research laboratories on Spadina Crescent. This increased Departmental research space by about four times and will allow a number of new programmes to develop. In particular, it will allow the opening of an optics laboratory and a study of problems of geriatrics, particularly related to the aging of vessels. The first year Fellows will now be increased from four a year to eleven a year. This, in turn, will increase the number of senior residents rotating through the teaching hospitals. We have undertaken, in conjunction with McGill University, to accept one first year man who will also rotate from the Royal Victoria Hospital in Montreal and to St. Joseph's

Hospital in Toronto. In addition, we have arranged to teach two first year men each year who will then rotate for clinical study to the Hamilton Civic Hospitals and St. Joseph's Hospital in Hamilton. This programme will undoubtedly become the foundation of the ophthalmic programme at McMaster University Medical School.

Planning that the research laboratories be used as a teaching as well as a research centre, an ophthalmic library has been included. Lecture space in the building has been obtained, where all the basic and clinical lectures in the Department will be given. The lecture room is large enough that it will become a neutral centre for Departmental meetings.

Departmental teaching and research programmes in the teaching hospitals continue to develop. The incorporation of Sunnybrook Hospital into the Medical School and the inclusion of the ophthalmic teaching programme at Sunnybrook into the main ophthalmic programme should be singled out. Dr. J. S. Speakman has been appointed Chief of Ophthalmology at Sunnybrook Hospital. He will continue to develop his studies of glaucoma at that hospital. All ophthalmic staff at Sunnybrook have been taken on the University staff and, as a result, the Department has greatly increased its teaching potential.

St. Michael's Hospital has greatly expanded its Eye Clinic and, as a result, a number of studies have been initiated and further special clinics have been started. St. Michael's also has offered research laboratory space for the study of retinal detachment and vascular circulation. The Hospital for Sick Children has offered space to the Department to study infections and external diseases, under Dr. J. J. Kazdan and Dr. J. S. Crawford. The Toronto Western Hospital has continued its special clinics including the Contact Lens Clinic. The Low Vision Clinic previously carried on there has been relocated at the Canadian National Institute for the Blind Headquarters on Bayview Avenue, under the direction of Dr. W. S. Hunter. The clinical staff has continued to develop special clinics at the Toronto General Hospital.

During the year the ophthalmic pathology laboratory has been busy, under the direction of Dr. W. S. Hunter and Miss E. Forster. They continue to obtain eyes from many hospitals in the city and province as well as from distant centres. The work done in this laboratory forms the background for much of the research studies of the Department. Dr. J. B. Walter, of the Department of Pathology, assists in this area, particularly giving his support in the field of electron microscopy.

The Eye Bank has become a major project in the Department and receives support from the Ontario Hospital Services Commission. It is now processing more than five hundred eyes a year, many of which are sent to hospitals across the province for use in transplantation. The surplus eyes are used for various research projects and have been forming the background for a number of improvements in the techniques of the Eye Bank.

The staff have attended many outside centres and only a few of their visits can be mentioned. Drs. Clement McCulloch, H. M. Macrae, J. S. Crawford, M. Shusterman, R. E. Groshaw, and H. R. Sniderman attended the International Congress of Ophthalmology in Munich, in August. Dr. R. K. MacDonald visited the Institute of Ophthalmology in London, England, and the Eye Department of the American University of Beirut, Lebanon, in December. Dr. John A. Parker attended the Aniseikonic Forum in Buffalo, in April. Dr. M. Shusterman visited the Jules Gonin Club meeting in Munich and the International Contact Lens meeting in Feldafen, Germany, in August. He also visited the Eye Institute of Columbia University in New York. Dr. R. E. Groshaw visited the Bascom Palmer Eye Institute in Miami and the Wilmer Institute in Baltimore, Maryland. Dr. Bernard Slatt attended the Neuro-Ophthalmology Symposium in Miami. Dr. H. A. Stein attended the annual Wills Eye Conference in February, the New Orleans Symposium on Congenital Defects, and gave one month's work to the Republic of Haiti. Dr. W. S. Hunter attended the Eye Alumni meeting of the Armed Forces Institute of Pathology in Washington, D.C., in June. Dr. Clement McCulloch was a visiting M.R.C. Professor at the University of British Columbia in January, and was a guest lecturer at the Cleveland Ophthalmo-

logical Club and the Buffalo Ophthalmological Society. Dr. J. J. Kazdan spoke on inclusion conjunctivitis at an ocular microbiology and immunology conference in Gainesville, Florida. Dr. Joseph C. Hill spoke at an International Symposium on Plastic Surgery at New York University, at the Pan Pacific Surgical Association meeting in Honolulu, and at the meeting of the American Ocularists Society in Chicago. Dr. Michael Shea spoke at the International College of Surgeons meeting in Bal Harbour, Florida, at the joint meeting with the New England Ophthalmological Society, Dublin, Ireland, and at the Wills Eye Hospital Cryosurgery Conference. Dr. G. A. Thompson has become a television personality as a result of his talks on the Eye Bank. Dr. J. S. Crawford spoke on congenital eye abnormalities at the New Orleans Academy of Ophthalmology. Many of the staff attended the American Academy of Ophthalmology and Otolaryngology meeting in Chicago. In addition to the above meetings, it should be mentioned that many of our staff attended the annual meeting of the Canadian Ophthalmological Society and presented clinical and research papers. They have also largely supported the Toronto Academy of Medicine, Section of Ophthalmology, and the Section of Ophthalmology of the Ontario Medical Association. They assisted at a forum on the perceptually handicapped child at the Hospital for Sick Children and at a number of graduate courses given by other departments or by non-university groups in Toronto.

Among the guests who visited and lectured in the Department during the year were Dr. W. Buschmann from Humbolt University, East Berlin, Dr. Ira Jones from the Presbyterian Medical Centre, New York, Dr. David G. Cogan from the Massachusetts Eye and Ear Infirmary, Dr. J. Draeger, Universität-Augenklinik, Hamburg, Professor Charles Dyson of London, Ontario, and Dr. Arthur Keeney of Philadelphia. Dr. Harold Falls of Ann Arbor, Michigan, gave the second Lloyd Morgan Lectureship at the Hospital for Sick Children.

The Canadian Ophthalmic Pathology Study Club has continued to be active. Dr. W. S. Hunter is the secretary. Drs. J. S. Speakman, M. Shea, W. S. Hunter, and Clement McCulloch contributed to the annual meeting in Kingston. Dr. McCulloch attended the inaugural meeting of the Canadian Forces Ophthalmological Society with Dr. B. Liddy. It should also be mentioned that a society for ophthalmic assistants was formed during the year. The officers are Dr. Harold Stein, Dr. M. Shusterman, and Dr. W. S. Hunter. A training programme for ophthalmic assistants is now under way.

An important item that should be noted is that Dr. Bernard Teichman became Chief of Ophthalmology at the New Mount Sinai Hospital. He has joined the Department in this capacity and will assist in undergraduate teaching and graduate training.

Another major event of the year was the publication of the text *The Eye in Childhood*. This was written by the Eye staff of the Hospital for Sick Children and is the first comprehensive text in English on the subject.

The Department would like to welcome Dr. J. J. Kazdan who has returned from a research year with the Proctor Foundation in San Francisco, studying uveitis and external diseases. Also, from the outpatient staff of Sunnybrook Hospital, Drs. H. A. Stein, R. E. Groshaw, S. R. Frankling, P. Young, H. L. R. Wiebe, and D. E. Sillers have joined the staff of the University Department. The Department regrets the retirement of Dr. H. M. Macrae who joined the Department in 1934 and has held a key position in the Department as the Senior Ophthalmologist at the Toronto General Hospital.

We would like to express our gratitude to the Canadian National Institute for the Blind and the E. A. Baker Foundation for the support of two Fellows and for help in other financial difficulties. We would also like to thank the Stapells family for support through the Stapells Fund for Ophthalmic Research. We are grateful for anonymous support for the Selkirk Fund, which allows many of our research staff to visit other centres. The Alumni has continued to give support both in person at meetings and in the contribution of papers to programmes and financial aid, for all of which we are grateful.

Honours

Dr. R. G. C. Kelly, Secretary, Canadian Ophthalmological Society; Executive Committee, Pan American Association of Ophthalmology; Consultant in Ophthalmology, Editorial Board, *Modern Medicine.*

Dr. G. A. Thompson, National Consultant, Canadian National Institute for the Blind; Chairman, Eye Bank Committee, Canadian Ophthalmological Society; Medical Director, Eye Bank of Canada, Ontario Division.

Dr. J. C. Hill, Medical Advisory Board, American Society of Ocularists.

Dr. J. S. Crawford, Chairman, Vision Panel of the Defence Research Board; Vice-President, Canadian Ophthalmological Society; Examiner, American Orthoptic Council.

Dr. Clement McCulloch, Editor, *Transactions of the American Ophthalmological Society*; Chairman, Medical Advisory Board, Toronto General Hospital; Examiner, American Board of Ophthalmology.

Dr. W. S. Hunter, Secretary, Section of Ophthalmology, Toronto Academy of Medicine; Consultant, Low Vision Centre, Canadian National Institute for the Blind.

Dr. H. A. Stein, Public Relations Chairman, Ontario Medical Association.

Dr. H. P. Brent, Executive, Section of Ophthalmology, Ontario Medical Association.

Scholarly Addresses

Dr. J. S. Crawford, "Surgical Treatment of Ptosis" at a meeting of The Buffalo Ophthalmological Club; "Congenital Abnormalities of the Eye" at the New Orleans Academy of Ophthalmology.

Dr. Joseph C. Hill, "Correction by Foreign Injection" at the Second International Symposium of the Manhattan Eye, Ear and Throat Hospital on Plastic and Reconstructive Surgery of the Eye and Adnexa; "Etiology and Treatment in Patent Lacrimal Passages," Tenth Congress, Pan Pacific Surgical Association, Honolulu; "Surgical Correction of Enophthalmos and Sunken Supratarsal Sulcus in Enophthalmos" at the American Academy of Ocularists, Chicago.

Dr. W. S. Hunter, "The Ophthalmic Assistant" at the Chicago meeting of The American Academy of Ophthalmology and Otolaryngology.

Dr. J. J. Kazdan, "Guinea Pig Inclusion Conjunctivitis" at the Ocular Microbiology and Immunology Conference, Gainesville, Fla.

Dr. Clement McCulloch, "Chronic Simple Glaucoma" at the Alumni Meeting of The Institute of Ophthalmology, New York City; "Cataract Extractions" at the Eye Teaching Day, State University of New York at Buffalo; "Why Glaucoma Operations Fail" at the meeting of the Cleveland Ophthalmological Society; "Microsurgery of the Eye," 1st Symposium at Tubingen, Germany; "Final Remarks" as representative of North America at the Closing Ceremony of the International Congress of Ophthalmology in Munich.

Dr. M. Shea, "Prophylactic Therapy in Retinal Detachment" and "Cryosurgery of the Vitreous" at the International College of Surgeons, Bal Harbor, Florida; "Experimental Epithelialization of the Anterior Chamber and Cryosurgery of the above" at the Joint Meeting of the New England Ophthalmological Society, Dublin, Ireland; "Problems of Intravitreal Cryosurgery," Wills Eye Cryosurgery Conference, Philadelphia.

Dr. J. S. Speakman, "Findings on Pituitary Ablation for Diabetic Retinopathy," Postgraduate Medical Seminar, Department of Ophthalmology, Queen's University, Kingston.

Dr. H. A. Stein, "New Instrument Report" and "Medical Impressions of Haiti," Mayo Clinic Alumni Meeting, Rochester, Minn.

Research

Under the National Health Grant "Artificial Cornea," Drs. P. K. Basu and B. Zucker are continuing studies on the problems of opaque cornea and treatment with

artificial cornea made of synthetic materials. Under an M.R.C. Grant, Dr. Basu and Dr. Y. Matuk are continuing studies on the immunology of corneal graft and biochemistry of cornea respectively. Biochemical research involves studies on the ATPase and protein synthesis in the cornea. In these studies, assistance has been obtained from Mr. F. Sanger of the Contact Lens Centre and technical assistance was provided by Mr. F. Carre, Mrs. I. Fielding, and Mrs. E. Marai. In cytological studies on the ocular structures, Dr. P. K. Basu and co-workers are using fluorescent microscopic techniques, time-lapse cinemicrophotography, and electron microscopy. A project on the preservation of corneal tissue using dimethyl sulfoxide has been completed.

Under an M.R.C. Grant, Dr. Y. Matuk, with the assistance of Dr. R. M. Gladstone, is continuing a study on the protein synthesis in the retinal tissue. Part of this will be submitted in a thesis by Dr. Gladstone as a requisite for a B.Sc. (Med) degree.

Under the direction of Dr. Basu, Mrs. A. Wolf and Mrs. I. Fielding continue their work in the Eye Bank laboratory. This laboratory is supported by a grant from the Ontario Hospital Services Commission. This unit is closely associated with the Canadian National Institute for the Blind and together they form the Eye Bank of Canada (Ontario Division). Since the beginning of the Eye Bank programme in 1955, 3,000 eyes have been donated for corneal transplantation. The total number of people who have pledged their eyes by signing donor cards is now 33,000.

The Corneal Research Clinic, which has been supported by a National Health Grant, continues to operate twice monthly at the Toronto General Hospital under Dr. G. A. Thompson, Director of the Eye Bank of Canada (Ontario Division). Dr. Thompson is investigating a family showing a rare corneal disease. With Dr. Basu, he is also experimenting on the use of intracorneal synthetic films for treating corneal edema.

With the support of a National Health Grant, "Prevention of Blindness from Glaucoma," Dr. J. S. Speakman is continuing morphological studies on the pathogenesis of open angle glaucoma. He is also making an assessment of patients with combined glaucoma, steroid-induced cataracts, and diabetic retinopathy. In collaboration with Dr. J. B. Walter of the Department of Pathology, an attempt is being made to study lens capsules with a view to establishing a normal variation of the appearance in the zonular lamella and the pathology of lens exfoliation. Under the same grant, Dr. R. K. MacDonald, assisted by Miss D. Kiselius, is continuing work on application of setons in glaucoma using fine glass and silicone materials. With the assistance of Dr. P. D. Chubb, Dr. MacDonald is also studying ocular rigidity. Under this grant, special investigative work on glaucoma patients is being conducted in the Glaucoma Clinics at the Toronto General Hospital under the direction of Dr. J. S. Speakman, at the Toronto Western Hospital under Dr. R. K. MacDonald, and at St. Michael's Hospital under the direction of Dr. J. D. Morin. Miss T. Fredette, Mrs. D. Adshead, and Mr. N. Matuk have assisted in different aspects of glaucoma research.

Under a National Health Grant entitled "Clinical Investigation of Ideopathic Retinal Detachment," Dr. M. Shea, Dr. G. M. Somerville, and Dr. D. R. Smith are continuing experiments on the development of retinal cryosurgical techniques. They are also studying the response of corneal mesothelium to freezing. Dr. C. B. Mortimer is also studying aspects of retinal disease and their treatment by various means. Dr. L. Chisholm is studying the effect of long-acting miotics on the retinal tissue. Evaluation of different retinal procedures is being carried out at the Retina Clinics at the Toronto General, Toronto Western, and St. Michael's Hospitals, under the direction of Dr. Mortimer, Dr. Chisholm, and Dr. Shea respectively.

Dr. H. R. Hausler, with the assistance of Dr. T. M. Sibay, Dr. M. Cooper, Miss B. Stachowska, and Miss I. Kazemir, is continuing basic and clinical studies on the ocular complications of diabetes, supported by the National Health Grant "Studies on the Pathology, Prevention and Treatment of Diabetic Retinopathy." An experimental model of diabetic retinopathy in the Chinese hamster was further explored and one of the double blind studies concerning the influence of liptropic factors on diabetic retinopathy was concluded at the Toronto Western Hospital.

Under a grant from the Defence Research Board, Dr. C. McCulloch, Dr. M. Cooper, and Mr. P. J. Foley are concluding research in the field of physiologic optics. With Dr. L. Thomas of the Department of Bio-Medical Electronics, Dr. Cooper has conducted a study on factors affecting the frequency of induced pupillary hippus.

Aided by a grant from the Atkinson Foundation, Dr. D'Arcy Macdonald has continued his research on contact lenses at the Toronto Western Hospital.

The clinical staff of the Department have undertaken a number of studies in fields related to their clinical interests. Dr. J. C. Hill continued his work on the plastic surgery of the eye. He and Dr. Basu, with the assistance of Dr. C. M. Godfrey and Mr. S. Brasier of the Division of Rehabilitation Medicine, have been developing a new type of orbital prosthesis. Dr. M. Shusterman is continuing his clinical research on vitreous floaters, retinal detachment, laser photocoagulation, cat gut allergy and intraocular lens for aphakia and cryosurgery of the retina. Dr. J. S. Crawford is working in the field of pediatric ophthalmology and use of fascia in ptosis. Dr. L. A. Lloyd has continued research into neuro-ophthalmological problems at the Hospital for Sick Children and the Toronto General Hospital. Dr. W. S. Hunter is continuing work in the field of ophthalmic pathology and remains a source of reference for pathological studies in the Department. Dr. J. A. Parker is evaluating a schematic eye for the Rhesus monkey and investigating the information-transmission capacity of the human visual system in the task of colour matching. He has been doing this work at the Centre for Visual Science and the Institute of Optics of the University of Rochester. Dr. M. Arstikaitis has been examining the fundi of all premature babies that are being treated with oxygen and the congenital anomalies of the eyes that come to the Hospital for Sick Children.

Dr. J. S. Speakman and Dr. C. B. Mortimer, with a number of the staff of the Toronto General Hospital, are continuing their study on the effect of pituitary ablation on diabetic retinopathy. Dr. G. A. Thompson is continuing work on the use of radioactive phosphorus as an aid in the diagnosis of intraocular lesions suspicious of malignancy. He is also studying ocular tumours at the Princess Margaret Hospital, guttate keratitits and keratopathy in cataract patients. Drs. H. P. Brent and W. D. Samis are studying fluorescein photography of the retina. Dr. J. J. Kazdan is studying uveitis and external disease problems in children at the Hospital for Sick Children. Also at the Hospital for Sick Children Dr. W. P. Callahan and Miss T. Crisall are continuing their studies of amblyopia.

Publications

Arstikaitis, Maria (with Morgan, A. L.) "Examination of Children"; "Refraction"; and "Strabismus"; in *The Eye in Childhood*, pp. 12–18; 19–27; 28–59. Chicago: Year Book Medical Publishers. 1967.

Basu, P. K. "Sex Chromatin in Transplanted Tissues"; in *The Sex Chromatin*, ed. Keith L. Moore, pp. 255–62. Philadelphia: W. B. Saunders. 1966.

——— "Some Aspects of the Corneal Graft Reaction and its Control" (*Survey of Ophthalmology*, vol. 11, no. 4, Pt. 2, 1966, pp. 522–32).

Basu, P. K. (with Narain, L.) "X-Irradiation of the Homologous Corneal Donor Material" (*Canadian Journal of Ophthalmology*, vol. 2, no. 1, Jan., 1967, pp. 54–7).

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OTOLARYNGOLOGY

Under the direction of Professor D. P. Bryce

The Department of Otolaryngology suffered a considerable loss with the retirement on June 30 of Professor Ireland. Professor Ireland had guided the course of the Department from 1947 until his retirement. During this period of time, and under his guidance, the Department had gained in strength and prestige throughout the world,

and the postgraduate course in Otolaryngology had become recognized as one of the outstanding courses on this Continent. A very large number of graduates from this course now practising in Canada and abroad made a special occasion of the Alumni dinner held in conjunction with the Postgraduate Refresher Course for Otolaryngology in order to extend to Dr. Ireland their very great appreciation for his efforts. Dr. Ireland was presented with a portrait which at the present time hangs in the departmental office.

In the field of basic and clinical research over the past fifteen years, the Department under Professor Ireland has contributed widely, particularly in the field of cortical audiometry and in vestibular research. Dr. Ireland retired as Chairman of the Department to become Head of the service at Sunnybrook Hospital during its developmental period.

During the past year, visits were made to the University of Michigan, Harvard, Johns Hopkins, and Syracuse in order to place Otolaryngology at the University of Toronto in proper perspective with other departments in universities of comparable size and activity. These visits were of great value and assistance in directing the activities of the Department during the past year.

Enlargement of the postgraduate course has been achieved in order to meet the needs of the country as a whole for specialists in this field and to progress with the changing demands for the modern training of residents in Otolaryngology. Developments in teaching methods, expansion of the staff in Otolaryngology, and an increased effort in the field of basic and clinical research have enabled us to increase the numbers in our postgraduate course from 17 to 27. Facilities have been developed in the teaching hospitals for temporal bone training laboratories. An increase in the academic portion of the postgraduate course has been possible by co-operation with other University departments and a course in physiology is to be added this fall with the assistance of the Division of Postgraduate Education and the Department of Physiology. A course was organized in temporal bone pathology and Dr. W. G. Hemenway from the University of Colorado was our first visiting professor for this type of academic instruction. Arrangements have been made during this year for association with the University of Saskatoon and discussions are under way with McMaster University for an association with these schools in the potsgraduate training of otolaryngologists. It is the purpose of this Department to increase the participation of postgraduate students in courses offered in other universities. We also plan to encourage their attendance at scientific meetings throughout the country and in particular make it possible for residents to present papers at these meetings. The Faculty members in the Department of Otolaryngology have been enthusiastic in support of the development of this resident training programme and it is our purpose to continue its improvement and expansion.

A programme of weekly University staff rounds was established at the beginning of the academic year and continued throughout the year. This was attended by all residents on the programme and a major portion of the Faculty in the Department of Otolaryngology. It was also co-ordinated with Pathological Rounds under the direction of Dr. William Anderson. During the course of the year, a large number of excellent presentations were prepared and delivered and this formed a major teaching facet of the postgraduate course.

A new Department of Otolaryngology has been organized at the Wellesley Hospital under the direction of Dr. Simon McGrail, and the one resident now training at that Centre will be increased to two over the next year. This department, although small, is well planned and well provided with facilities and equipment for its role in the teaching of postgraduates and undergraduates. A further department is planned at the New Mount Sinai Hospital, which will in the near future also play a part in the postgraduate resident programme.

A further result of the visits to other comparable universities has been the revision of the undergraduate training programme in the Department of Otolaryngology. Dr. H. O. Barber is Chairman of the Curriculum Committee within the

Department in order to properly organize this programme and to investigate methods by which it can be improved. Undergraduate training has been expanded during the past year into New Mount Sinai Hospital, under the direction of Dr. Joseph Gollom.

Considerable efforts have been made in the past year to expand and increase the programme with regard to the development of cortical audiometry as a method of screening infants for deafness and also as a service method of audiometry in the testing of adults. Support has been continued by a private source for this work and considerable space and facilities have been approved for the first major phase of this programme in the Toronto General Hospital. It is proposed that this programme will be extended to include similar facilities at the Hospital for Sick Children and eventually in other areas as well as an increased use of electroencephalography as a screening method for infants throughout the province. This particular programme will continue to be a major one in the Department over the next few years and will necessitate also a considerable increase in the facilities for the training of personnel in speech and hearing at the University in conjunction with the hospital facilities.

A major step forward in the development of basic research in the Department has been accomplished in the development of a temporal bone laboratory in the Banting Institute with a special M.R.C. Grant for the necessary equipment to outfit this laboratory. Dr. Walter H. Johnson, as Director of Research in the Department, has headed up a Department Committee on Research, which is active in the development of research facilities to be associated with this laboratory. Dr. Joseph Farkashidy, as head of the Committee of the Temporal Bone Laboratory, paid an extensive visit to Harvard University in order to improve our facilities along this line. This laboratory is essential to the functioning of the Department of Otolaryngology and plays a part both in the undergraduate and postgraduate teaching. It is a necessary feature in any basic research programme.

A study was also begun this year with the assistance of a grant from the Ontario Cancer Foundation into the histopathology of post-irradiated laryngeal carcinoma. This laboratory is situated in the Department of Pathology at the Toronto General Hospital and is also a first step in the development of a major section of basic and clinical research. Dr. Walter Johnson, with Dr. Brydon Smith, is currently engaged in the laboratories of St. Michael's Hospital in a study of the physiology of the internal ear with the support of the Atkinson Foundation.

The clinic at the Princess Margaret Hospital for the diagnosis and treatment of malignant disease of the ear, nose, and throat has continued to be an extremely active one. Representatives from the various hospitals within the Department continue to play a major part in the organization and maintenance of the service.

During the course of the year, the Department has organized and put on a course for general practitioners in Otolaryngology, and a refresher course for specialists in Otolaryngology. The general practitioners' course was held on December 7 and 8 at the Hospital for Sick Children and the subject matter was related to paediatric otolaryngology. A refresher course in Otolaryngology was held in January with Dr. Brian McCabe of the University of Iowa and Dr. Daniel Baker of Columbia University as guest speakers. These courses were well attended and further courses of a similar nature are planned for the coming year.

The members of the Department continue to play a large part in the Section of Otolaryngology of the Academy of Medicine programme throughout the year.

As part of the centennial year celebrations, the major specialty societies in Otolaryngology of the United States met in Canada this year. Prior to a meeting of the American Laryngological Association and the American Otological Society at the Seigniory Club, the American Board of Otolaryngology held their examinations in Toronto, the week of May 8. The clinical examinations for this Board were held at the Toronto General Hospital with collaboration from all the other teaching hospitals within the Department. The American Triological Society, the American Broncho-Esophagological Society, and the American Head and Neck Society met in Montreal late in May and members of this Department presented papers at all these meetings.

This has been a very active and busy year within the Department with development in all facets of its activity. The new departmental offices have been established on the third floor of 92 College Street, where much greater space is available for the proper functioning of the Department. The laboratory space in the Banting Institute is also currently under reconstruction and modernization and this will provide much improved facilities for the coming year. A considerable increase of space for the departmental research facilities will be necessary in the future, and further space has been provided this year in the old church on the north side of College Street, where three offices are currently being occupied.

Honours

Dr. Blair Fearon has been president of the American Broncho-Esophagological Society.

Dr. D. A. Haldenby was elected secretary, Section of Otolaryngology, Toronto Academy of Medicine.

Scholarly Addresses

Dr. H. O. Barber, January, 1967, Royal College of Physicians and Surgeons of Canada, Ottawa, Ontario, "Vascular and Viral Symposium on Vertigo"; January, 1967, Eastern Section of the Triological Society, Syracuse, "Release of Nystagmus Suppression in Clinical Nystagmography"; June, 1967, Canadian Otolaryngological Society, Quebec City, "Laboratory Assessment of Anti-Motion Sickness and Anti-Vertigo Drugs"; June, 1967, University of Colorado, Denver, Colorado, "Postural Vertigo."

Dr. T. D. R. Briant, July 9 and 10, 1966, Academy of Ophthalmology and Otolaryngology, Portland, Oregon, "Techniques of Transphenoidal Hypophysectomy," "Indications for Transphenoidal Hypophysectomy," "Treatment of Angiofibroma," "Extracranial Patching of C.S.F. Leaks"; October, 1966, Academy of Ophthalmology and Otolaryngology, Chicago, U.S.A., "Fascial Patching of C.S.F. Leaks"; February, 1967, Academy of Medicine, Toronto, Round Table Talk on Nasopharyngeal Carcinoma; University of Minnesota, Academy of Ophthalmology and Otolaryngology, "Hypophysectomy and Angiofibroma of the Nasopharynx"; May, 1967, Montreal, Quebec, American Triological Society, "Diagnosis of Cerebral Spinal Rhinorrhea and the Rhinologic Approach to Its Repair"; May, 1967, American Academy of Facial, Plastic, and Reconstructive Surgery, "Reconstructive Procedures in Head and Neck Surgery Following Radiation"; June, 1967, Canadian Otolaryngological Society, Quebec City, "Dermoids of the Frontal Bone."

Movie: "Transphenoidal Hypophysectomy," eleven-minute movie, colour, sound and animation, shown to the Royal College of Physicians and Surgeons of Canada, Ottawa, January, 1967.

Professor Douglas P. Bryce, Panel Discussion of Carcinoma of the Palate, Tonsil and Base of Tongue, Eastern Section of the American College of Surgeons, Syracuse, 1966; "The Trough Method of Laryngotracheal Repair," Seigniory Club, May, 1967, American Triological Society.

Dr. R. D. Bell, University of Toronto Postgraduate Course in Otolaryngology, "The Temporal-Mandibular Joint as a Cause of Facial Pain."

Dr. Blair Fearon, "The Importance of Tracheal Dimensions in Performing Tracheotomies and Endotracheal Intubation in Children," Section of Otolaryngology, Michigan State Medical Society, Grand Rapids, Michigan, September, 1966; "Respiratory Emergencies in Infants and Children," Michigan State Medical Society, Grand Rapids, Michigan, September, 1966; "Aspects of Paediatric Broncho-Esophagology," Panel Moderator, Meeting of the Society of American Broncho-Esophagology, May, 1967.

Dr. G. A. Fee, "Comparison of High Tone Improvement in Stapedectomies with Wire and Tissue, Wire and Teflon, and Wire and Gelfoam Prostheses," Toronto Academy of Medicine, 1967.

Dr. David A. Haldenby, "Recent Otolaryngological Assaults on Ménière's Disease, Acoustic Neuroma and the Pituitary," Toronto Western Hospital Clinical Society, November, 1966; "Carcinoma of the External Auditory Canal and Middle Ear," Ontario Medical Association Section on Otolaryngology, May 12, 1967.

Dr. Walter H. Johnson, "Vestibular Problems in Space Travel," Royal College of Physicians and Surgeons, Ottawa, January, 1967; "Assessment of Vestibular Sensitivity," American Otological Society, Montebello, Quebec, May, 1967; "Physiological Responses to Unusual Vestibular Stimulation," National Aeronautics and Space Administration Symposium, Pensacola, Florida, January, 1967.

Dr. Arnold Henry, annual Australian Otolaryngological Society meeting, Sydney, Australia, October, 1966.

Dr. Simon J. McGrail, "Electrical Stimulation of the Facial Nerve," Presented to the General Medical Staff (Scientific) of the Wellesley Hospital, November 9, 1966; "Surgery for Conductive Deafness," General Practitioners Refresher Course, December, 1966.

Dr. K. Brydon Smith, "The Management of Facial Paralysis," Ontario Medical Association, May 12, 1967.

Research

Research activity in the Department has continued to expand, involving the continuance of previously established projects, the instigation of several additional ones, and arrangements for the introduction of several new ones in the near future. In order to enable co-ordination and prevent duplication of the research centred in the Banting Institute and those projects best carried out in the associated hospitals, a "Research Committee" has been established, consisting of Professor D. P. Bryce, Drs. W. H. Johnson (Committee Chairman), H. O. Barber (Sunnybrook Hospital), B. Fearon (Scarborough General Hospital), J. Farkashidy (Toronto General Hospital), W. S. Goodman (Toronto General Hospital), J. Gollom (New Mount Sinai Hospital), D. A. Haldenby (Toronto Western Hospital), and P. E. Smith (St. Michael's Hospital). This Committee holds regular luncheon meetings at least once monthly and in addition to recommending and reporting on research subjects, also considers matters of financial support, laboratory facilities, technical assistance, training of residents in research procedures, and so on.

A very significant facility has been established in the basement of the Banting Institute which will undoubtedly be of considerable value both for teaching and research. With the financial assistance of a grant from the Medical Research Council (The Dean's Special Fund) a well-equipped histological laboratory to enable ordinary light microscopy of the temporal bone has been added to the Department's facilities. A technician (Mr. Bruce Smith) has received appropriate training from the Defence Research Medical Laboratories (Toronto) and the Massachusetts Eye and Ear Infirmary (Boston). In addition, bone specimens and slides have been generously donated by Dr. John Lindsay of the University of Chicago and Dr. Brian McCabe of the University of Iowa. This acquisition, together with greatly improved laboratory facilities (now in construction) to enable electron microscopy research of the inner ear now provides the Department with excellent facilities for pathologic and other research investigations of the inner ear.

Research in the associated hospitals is expanding. During the past year the following projects have been active:

(1) At the Toronto General Hospital, Drs. H. O. Barber, J. Farkashidy, and W. H. Johnson have been investigating the significance of various types of labyrinthine nystagmus, in both normal and pathologic subjects, utilizing the facilities of the Vertigo Unit, and with financial assistance from the Hartford Foundation of New York. The relative effectiveness of various antivertigo and anti-nauseant drugs has also received attention with financial assistance from Poulenc Limited and Sandoz Pharmaceuticals, both of Montreal.

Drs. W. S. Goodman, J. W. Scott, and S. V. Appleby have introduced the

testing of hearing of newborns using the newly developed procedure of cortical audiometry with encouraging results. Further research is required to perfect this technique, and financial assistance has been made available from a private source (Mr. E. C. Fox).

Dr. D. P. Bryce has continued his research on the histopathology of the larynx and has made arrangements for the establishment of electro-myographic studies of laryngeal activity.

(2) Vestibular research at St. Michael's Hospital has continued to be active. Drs. J. K. B. Smith and W. H. Johnson have utilized the newly provided research laboratories carrying out experimental surgery on the inner ear of monkeys in attempts to clarify the function of separate sensory receptors of the organ of balance. In addition, a computerized technique to enable rapid quantitative assessment of vestibular sensitivity in humans has been developed which promises to aid in the diagnosis of vestibular disease in humans. Financial assistance was available from the Atkinson Charitable Foundation of Toronto.

(3) At Sunnybrook Hospital, Drs. H. O. Barber and W. M. Hawke have tested techniques to enable evaluation of the effectiveness of nasal decongestants. This research has only recently been established and financial support has been obtained from the CIBA Drug Company of Montreal.

(4) In the Banting Institute Drs. W. H. Johnson and J. A. Orpin have been investigating the autonomic effects of vestibular stimulation. This research, which received financial support from the Defence Research Board of Canada, has both military and clinical applications in that the results would provide an understanding of body function incapacity resulting from intense stimulation of the non-auditory labyrinth. This research is being carried on in co-operation with the Department of Physiology and the Institute of Bio-medical Electronics, both of the University of Toronto.

Dr. G. F. Dohlman, a Visiting Professor from Sweden and employed by the Defence Research Medical Laboratories in Toronto, has continued his electron microscopic investigation of the cellular physiology of the organ of balance. This research has helped considerably in our understanding of the basis of Ménières disease and has established specific discrete functions to the various cellular components of the organ of balance.

Publications

Bryce, D. P. *Cancer of the Head and Neck.* Washington: Butterworths. 1967. Pp. 6.

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Fee, G. A. "Comparison of High Tone Improvement in Stapedectomies with Wire and Tissue, Wire and Teflon and Wire and Gelfoam Prostheses" (*Proceedings of Canadian Otological Society*, 1966).

Goodman, W. S. "A Technique of Tympanoplasty" (*Proceedings of the Canadian Otological Society*, 1966).

Johnson, W. H. "Physiologic Responses to Unusual Vestibular Stimulation" (*Proceedings of the 4th Symposium, National Aeronautics and Space Administration*, Pensacola, 1967).

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PAEDIATRICS

Under the direction of Professor H. W. Bain

Dr. A. L. Chute retired as Head of the Department of Paediatrics in July of 1966 to become Dean of the Faculty of Medicine. Dr. H. W. Bain took over as Head of the Department of Paediatrics.

Several significant events occurred during the past year. A new Division of Research within the Department of Paediatrics was formed and Dr. Andrew Sass-Kortsak was named Research Professor of Paediatrics. Neurology, which had been a sub-division of Psychiatry, was given full divisional status with Dr. J. S. Prichard as its Head. A Clinic for Adolescent Medicine was formed with Dr. Martin Wolfish as its Head. A Clinic for Management of Perceptually Handicapped Children was formed under the direction of Dr. J. S. Prichard with Dr. A. Rebhan as its Head. A Division of Gastroenterology was formed with Dr. Richard Hamilton as its Head.

Dr. John Bailey was named Head of the Sunnybrook Division of the Department of Paediatrics and has retired as Head of the Out-patient Department of The Hospital for Sick Children. He will remain as Head of the Division of Endocrinology at The Hospital for Sick Children until the Sunnybrook Paediatric Division begins to function.

Dr. Charles Snelling reached retirement age after 34 years of service in the Department of Paediatrics. He still maintains an active paediatric practice and is in charge of the development of the new North York General Hospital. We are grateful to Dr. Snelling for the many contributions he has made to the undergraduate and graduate teaching programmes of this Department. His ability as a clinician was an inspiration to all who studied under him.

Dr. Donald McLean, Chief of Virology, is retiring at the end of the current session to assume the position of Professor of Microbiology at the University of British Columbia. Dr. McLean developed his department to a high degree, not only in the area of research but also in teaching and service to patients. We are sorry to lose him and wish him success in his new position.

The Department was saddened by the death of Dr. George McNaughton in December of 1966. Dr. McNaughton joined the staff of the Hospital Department of Paediatrics, in 1935 and was Head of the Division of Infectious Disease at the time of his death. He was above all a kindly physician and colleague, a great clinician and teacher. He will be missed by all who knew him.

On April 14, 1967, Dr. Chute's retirement was marked by "Dr. Chute Day" at The Hospital for Sick Children. The Hospital medical staff and many of Dr. Chute's trainees gathered to honour Dr. Chute for his many contributions to the field of Paediatrics and to the Hospital. A scientific programme presented by distinguished graduates of Dr. Chute's training programme was followed by a banquet and presentation of an oil painting to Dr. Chute. Dr. Chute presented the painting to the staff and it now hangs in the Hospital's large lecture theatre. Speakers at the scientific programme were:

Dr. W. Cochrane	Professor of Paediatrics, Dalhousie University Dean-Elect, Calgary Medical School
Dr. Donald Fraser	Research Institute, The Hospital for Sick Children
Dr. Donald Hillman	Director of Endocrinology, Montreal Children's Hospital
Dr. G. LeBoeuf	Research Department, L'Hopital Sainte-Justine, Montreal
Dr. L. Naiman	Assistant Professor, Paediatrics, Temple Univerity School of Medicine, Philadelphia Director of Haematology, St. Christopher's Hospital for Children, Philadelphia
Dr. R. Rowe	Professor of Paediatrics (Cardiology), Johns Hopkins Hospital
Dr. R. Slater	Former Dean of Medicine, University of Burlington, Vermont

In September of 1966, the Department was host to the Paediatric Travel Club, a group of distinguished paediatricians from Canada and the United States. The scientific programme was presented by members of the Hospital staff and various departments.

In June of 1967, the Division of Cardiology, under the direction of Dr. John Keith, was host to a group of world renowned cardiologists. The scientific programme was contributed to by Dr. Pierre W. Duchosal, Geneva, Switzerland, Dr. Eugene J. Fischmann, Washington, U.S.A., and Dr. Paul Hugenholtz, Boston, Mass.

In addition to those listed above, the following visited the Department of Paediatrics during 1966–1967:

Dr. Robert Ward	Los Angeles, California
Dr. Charles A. Janeway	Professor of Paediatrics, Boston Children's Hospital
Dr. Neil Begg	Dunedin, New Zealand
Professor Wilfrid Gaisford	University of Manchester
Dr. Chester M. Edelmann, Jr.	Albert Einstein College of Medicine, New York
Dr. Walter Hitzig	Zurich, Switzerland
Dr. Irving Schulman	University of Illinois
Dr. Murray McGeorge	Dunedin, New Zealand
Professor Andrea Prader	Zurich, Switzerland
Dr. Harry Harris	University College, London, England
Professor Douglas Hubble	University of Birmingham, England
Dr. Michael Galton	Assistant Professor of Pathology, Dartmouth Medical School, Hanover, N.H.

Undergraduate Teaching

During the past year, we have arranged for the fourth year students to live in for a five-day period in groups of four. This has allowed them to spend more time in the Emergency and Out-patient departments as well as in specialized areas such as the newborn ward. It is hoped that we will be able to increase this component of their training during the coming session.

The Summer Student Programme of the Research Institute of The Hospital for Sick Children and the Department of Paediatrics has been greatly expanded, and during the coming holiday season there will be twenty-three students engaged in research projects and nine in clinical areas.

The Department welcomed its first graduate elective student, a resident from Dr. Warren Wheeler's Department of Paediatrics in Lexington, Kentucky. It is planned to arrange elective time both within and without our institution for our own residents during the coming session.

As in all other departments of the Faculty of Medicine, a great deal of time is being spent on reorganization of the curriculum. The Department of Paediatrics is represented on most of the systems committees. Major changes will be made in our teaching programmes for the third and fourth year medical students during the coming session in preparation for the new curriculum.

Honours

In March and April of 1967 Dr. H. W. Bain visited the major paediatric hospitals in Great Britain, Europe, and Scandinavia, and attended the European Paediatric Endocrine Society Meeting which was held in Israel.

In Mexico, Dr. J. M. M. Darte was made Honorary Life Member of La Asociación Mexicana de Profesores de Pediatría.

Dr. Henry Levison was made a member of the American Society for Pediatric Research.

Dr. J. A. Peter Turner was made a member of the Council of the American Thoracic Society.

Scholarly Addresses

Dr. N. Aspin, Paediatric Travel Club. Dr. J. D. Bailey, American Society for Paediatric Research. Dr. J. M. M. Darte, Seattle, Washington; Congresos de Pediatría, Mexico; University of the West Indies, Kingston, Jamaica. Dr. H. Ebbs, Charles A. Janeway Child Health Centre, St. Johns, Newfoundland. Dr. R. Ehrlich, American Association of Clinical Chemists of the New York State Division Workshop on Diabetes; Seigniory Club, Montebello, Quebec. Dr. R. S. Fowler, Medical Scientist Lecture Series, Queen's University, Kingston. Dr. D. Fraser, Medical

College of Georgia. Dr. J. R. Hamilton, Canadian Paediatric Society; American Society for Paediatric Research. Dr. M. Havelkova, World Congress in Psychiatry, Madrid, June, 1966. Dr. W. A. Hawke, World Commission for Cerebral Palsy, Germany, August, 1966; Oxford, England, April, 1967. Dr. R. Imrie, New Jersey College of Medicine and Dentistry. Dr. J. D. Keith, New England Cardiovascular Society, Boston, Mass.; Fifth World Congress in Cardiology, New Delhi, India, 1966. Dr. Langford Kidd, Canadian Federation of Biological Societies, Vancouver, 1966; Canadian Cardiovascular Society, Calgary, 1966. Dr. Bernard Laski, 55th Ross Conference on Paediatric Research. Dr. H. Levison, Federation of American Societies for Experimental Biology, Chicago, April, 1967. Dr. J. A. Lowden, Paediatric Travel Club, Annual Meeting, Toronto, October, 1966; Canadian Society for Clinical Investigation, Ottawa, January, 1967; Conference on Drugs and Poison; Etiologic Agents in Mental Retardation, Palo Alto, Calif.; Symposium on Multiple Sclerosis, Quebec City, June, 1967. Dr. D. M. McLean, American Society for Tropical Medicine Hygiene, San Juan, Puerto Rico; Laboratory Section of the Canadian Public Health Association, Montreal; Canadian Society for Clinical Investigation, Ottawa; American Society for Microbiology, New York; International Northwest Conference on Diseases in Nature Communicable to Man, University of Saskatchewan. Dr. E. G. Murphy, International Scientific Conference, Columbia University. Dr. J. D. Murray, 6th Inter-Science Conference on Antimicrobial Agents and chemotherapy, Philadelphia, Pa. Dr. I. Radde, Department of Clinical Chemistry and Cardiology, First Medical Clinic, Dusseldorf, Germany. Dr. A. Sass-Kortsak, Children's Medical Center, Harvard University, Boston, Mass. Dr. P. R. Swyer, Paediatric Travel Club. Dr. Margaret Thompson, Symposium on Teaching Medical Genetics, Third International Congress of Human Genetics, Chicago; Department of Biology, McMaster University; First National Conference on Maternal & Child Health, Ottawa; Department of Psychology, University of Guelph; Division of Medical Genetics, State University of New York at Buffalo.

Research

Research activity within the Department of Paediatrics continues to increase. Dr. Sass-Kortsak has been charged with the responsibility of organizing research projects for our resident staff.

Allergy

Dr. C. Collins-Williams and Dr. M. Moscarello have continued their research on gammaglobulin levels in normal and asthmatic children and have published three papers with two more in press. Dr. Collins-Williams is joining the Department on a half-time basis as of July 1, 1967, and will be geographic full-time by July, 1968. A major development of this division is contemplated.

Cardiology

1. The first stage of a long-term study of the natural history of the ventricular septal defect was completed by Drs. Keith, Rose, Collins, Kidd, and Fowler.
2. The coronary arterial anatomy in complete transposition of the great vessels was studied by Drs. Shaher and Puddu. Various patterns were recorded.
3. Spontaneous closure of the ventricular septal defect in two cases of complete transposition of the great vessels was studied by Drs. Shaher, Fowler, Kidd, Moes, and Keith.
4. The acid-base balance in complete transposition of the great vessels was investigated by Drs. Shaher and Kidd.
5. The preoperative and postoperative electrocardiogram in complete transposition of the great vessels was investigated by Drs. Khoury, Shaher, and Fowler.
6. An assessment of the vectorcardiogram in complete transposition of the great vessels was made by Drs. Khoury, Shaher, and Fowler.

7. Dr. F. Moes investigated the pulmonary vascular patterns demonstrated radiologically in children under one month of age. The first stage of this study included aortic atresia, anomalous pulmonary venous drainage, and the ventricular septal defect.

8. Dr. Fowler and Dr. Viscaino examined the electrocardiographic patterns in tetralogy of Fallot comparing the electrocardiogram with the vectorcardiogram.

9. Dr. Fowler and Mr. O'Beirne are continuing with a long-term study on the use of computers in evaluating the electrocardiogram in congenital heart disease at various ages.

10. Dr. Langford Kidd has continued his research into the haemodynamics of ventricular septal defect, tetralogy of Fallot, and transposition of the great vessels, with special reference to the effect of inotropic agents on shunting.

11. Dr. Kidd has also studied the effect of Propranolol, a beta-adrenergic blocking agent, on the circulation of normal anaesthetized dogs.

12. Dr. Kidd has just started a study of the effect of various drugs on the pulmonary vascular resistance changes in hypoxic dogs.

Chest

Dr. J. A. P. Turner and Dr. Patricia Mark have completed a five-year study of the hospital's experience with lung abscesses in childhood.

Dr. Henry Levison, a pulmonary physiologist, joined the staff in September of 1966 and has established a pulmonary function laboratory. A long-term study of asthmatic children has been initiated.

Dr. Douglas Crozier has continued his clinical research in fibrocystic disease of the pancreas.

Endocrinology

Dr. J. D. Bailey and his group have continued their studies of growth hormones and growth failure.

Genetics

Dr. Margaret Thompson, in collaboration with Dr. E. G. Murphy, continued studies of Duchenne type of muscular dystrophy. Dr. Qasi continued his investigation of the genetics of the adrenogenital syndrome due to adrenal hyperplasia.

Haematology

Dr. John Darte and Dr. Marilyn Sonley are continuing their investigations with chemotherapeutic agents in malignant disease.

Dr. Peter McClure has five projects underway: (1) the study of thrombopoietic activity in idiopathic thrombocytopenic purpura, (2) a comparison of erythropoietin and thrombopoietin activity in iron-deficiency anemia and idiopathic thrombocytopenic purpura; (3) a study of causes of abnormal bleeding in newborn infants and premature, with special reference to erythroblastosis and respiratory distress syndrome; (4) a study of AHF levels in female relatives of patients with haemophilia and Christmas disease; (5) a pilot survey of bleeding disorders in three eastern Ontario counties, with plans to enlarge the survey to other parts of Ontario.

Infectious Disease

Dr. W. Fujiwara and Dr. J. Murray in co-operation with Dr. Fleming from the Bacteriology Department and Dr. J. S. Prichard of Neurology have been studying the effects of antibiotics in purulent meningitis. This has been a controlled prospect of study of the efficacy of different antibiotic regimens. Dr. Donald McLean has continued his biological studies producing new information on mumps, mumps meningoencephalitis, and Rubella syndrome. Studies on gastroenteritis have continued under the supervision of Dr. Richard Hamilton and Dr. Donald McLean, with particular reference to the effect of monosaccharide and disaccharide feedings early in the recovery phase of this disease.

Metabolic Diseases

Dr. Donald Fraser, Dr. Ingeborg Radde, and their group continue to study calcium and magnesium metabolism. Some of the studies have been carried out in patients suffering from a variety of metabolic diseases—vitamin D deficiency rickets, vitamin D refractory rickets, cystinosis, primary hypomagnesemia, and recently clinical conditions with primary disturbances in parathyroid function. Much of the laboratory work is carried out on experimental animals, which serve as models of the clinical conditions. The laboratory studies have involved particularly the interrelation of serum magnesium and serum calcium in magnesium-depleted dogs, and the measurement of parathyroid hormone levels in serum by a radio-immunological technique. Also, an attempt is being made to work out techniques for using Ca^{48} as a tracer in humans. Use of this stable isotope would eliminate the dangers and the objections of using radioactive substances in children.

Professional members of the group are Drs. Alice Chan, George Cherian, Sang Whay Kooh, SeMo Suh, S. Pensuwan, and E. Wittermann.

Dr. Andrew Sass-Kortsak in co-operation with Dr. J. L. Weber continued investigation of liver disease in children and in collaboration with Drs. N. Aspin and B. Sarkar, continued the studies on copper metabolism and Wilson's disease. Dr. Sass-Kortsak and Dr. S. H. Jackson continued their studies of amino acid metabolism.

Dr. B. Sarkar continued his studies on iron transport and Dr. William Hanley continued his study on growth and development in phenylketonuria.

Dr. Robert Ehrlich along with Dr. Julio Martin and Dr. J. J. Gagliardino have continued their studies of carbohydrate metabolism with special reference to hypoglycemia and diabetes.

Nephrology

Dr. Phillip Rance joined the geographic full-time staff and is in charge of this division. In conjunction with Dr. Robert Jeffs and Dr. William Harvey, he has established a renal dialysis unit. With the assistance of the Department of Pathology and Dr. Pat Conen, assessment of renal biopsy material continues. A clinical study of the effects of immuno-suppressive agents on nephrosis is also under way.

Neonatology

Dr. Paul Swyer with his associates have nine projects in process. These are listed below.

1. The Physiology and Pathophysiology of Assisted Ventilation in the Newborn. Drs. J. B. Owen-Thomas, O. Ulan, and P. R. Swyer.
2. Comparison of Sodium Bicarbonate and Tham as Alkalinizing Agents in Newborns. Drs. M. deLisle, O. Ulan and P. R. Swyer.
3. Assessment of Umbilical Arterial Catherization. Drs. O. Ulan and P. R. Swyer.
4. Assessment of Treatment of Meconium Aspiration Syndromes. Drs. L. Linsao, H. Levison and P. R. Swyer.
5. Phenylketonuria. Drs. W. B. Hanley and L. Linsao.
6. Assessment of Results of Assisted Ventilation in Newborns. Drs. L. Linsao, O. Ulan, M. deLisle, H. Levison, and P. R. Swyer.
7. Investigation into Hypoxia in Relation to Oxygen Therapy. Drs. L. Linsao, O. Ulan, and P. R. Swyer.
8. The Mechanics of Breathing and Treatment of the Wilson-Mikity Syndrome. Drs. J. B. Owen-Thomas, O. Ulan, and P. R. Swyer.
9. Intravascular Clotting Syndromes in the Newborn. Drs. P. McClure, S. Choi and H. Levison.

This department now has a world-wide reputation.

Neurology

Dr. J. S. Prichard and his group continued their clinical studies in convulsive

disorders, and in conjunction with Dr. Kikas, Dr. Murphy, and Miss L. Crocker, are measuring the nerve conduction velocity in EMG of premature babies.

Dr. A. Lowden along with Dr. M. Moscarello and Dr. J. Wood are carrying out extensive investigation of brain lipids.

Psychiatry

Dr. William Hawke in conjunction with Dr. M. Havelkova is studying the effect of niacin on schizophrenic children.

Publications

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PATHOLOGICAL CHEMISTRY

Under the direction of Professor A. G. Gornall

In 1911 Professor J. B. Leathes, speaking of Pathological Chemistry, said, "this University is giving, or about to give, on a more liberal scale than has been customary in the past, the facilities for study in this direction." At that time Toronto ranked among the foremost medical schools on the continent. It is gratifying to record that the same statements are appropriate in 1967. Although the Department has had its setbacks, one being its detachment from direct responsibility for the hospital service chemistry laboratories, it has been sustained by the able leadership of Andrew Hunter, V. J. Harding, and James A. Dauphinee. Now the prospect of it assuming in full measure the important tasks that are its natural responsibility is most encouraging.

Throughout the field of medical education no subject has generated more discussion in recent years than biochemistry, particularly in its ever increasing clinical applications. This is in part because of the fact that some departments of biochemistry have developed in faculties of science, some in medicine, and others as an outgrowth of pathology. In the hospitals biochemistry is seen as one of the service functions sometimes grouped as laboratory medicine. It is not surprising that names with different connotations such as clinical chemistry, medical biochemistry, and chemical pathology have arisen. In the University setting the name Pathological Chemistry is an appropriate if not universally popular description of this discipline. In a hospital setting the term Clinical Biochemistry seems to be the most acceptable compromise. For these reasons we have suggested that in the future the University Department of Pathological Chemistry should be made up of Departments of Clinical Biochemistry established in each of the teaching hospitals of the Toronto Medical Centre.

For the past three years considerable effort has been expended in analysing and defining the aims and purposes of the Department. This has been a valuable experience in which all senior members of staff have participated and to which all have made significant contributions. For this the Chairman wishes to record his deep appreciation. It is not appropriate here to set forth in detail the many factors that have been weighed in coming to the decisions that have been reached. The effort has borne fruit in the positive statements we have been able to make with regard to the future place of this Department in the Faculty, its teaching responsibilities, and the emphasis of its research. These academic pursuits find their practical expression in the clinical biochemistry services provided in our hospitals. In some cases these laboratories are already carrying the largest work-load and will continue to do so for the foreseeable future. Such a task requires not only a skilled staff to provide the service, but people in our medical schools to teach the use of these services and to make the biochemical mechanisms of disease their field of academic study. Most important of all for the future will be the capacity of our Department to educate and train new generations of clinical biochemists. We look forward to the strengthening of purpose and opportunity that will be achieved by reuniting the teaching, research, and service functions of the Department.

Undergraduate Teaching

In his report last year Professor Dauphinee described in considerable detail the teaching programmes of the Department. It seems necessary to make only brief reference to them here. The undergraduate course to 183 students followed with minor improvements the pattern used last year. The stated aims of this course are (1) to provide an understanding of the biochemistry and physiology of the disease process and (2) to develop a facility in the selection of tests and the interpretation of laboratory data. We continue to place increasing emphasis on student participation in "workshop" tutorials and seminars. The general reaction of the students has been favourable and we are aware of areas where further change is desirable. Considerable thought has been given to our role in the revised curriculum and recommendations have been and will be made to the various committees working on this problem. We acknowledge with sincere thanks our indebtedness to the following physicians who have held sessional appointments and assisted with our seminar teaching: Drs. B. A. Tobe, J. S. Olin, G. A. deVeber, G. Hill, D. Malkin, C. S. Saiphoo, R. N. Green, L. A. Edwards, H. J. Lackner, B. H. McGrath, and D. C. Murray.

Graduate Teaching

The graduate courses of this Department are expected to grow steadily in importance. An advanced course in Pathological Chemistry, similar to that given by Dr. A. Malkin to internes, residents, and fellows at Sunnybrook Hospital, will gradually be extended to include the other teaching hospitals. Advanced courses in

the School of Graduate Studies given this year include 1004, "Selected Topics in Pathological Chemistry," to which all the senior staff contributed. Course 1005, "Clinical Chemistry," was given by Drs. C. J. Porter and D. Michener Schatz with the help of Drs. S. H. Jackson and A. Rapoport. Twenty-eight students, including seven clinical pathologists, have taken this course. Course 1007, "The Chemistry of Biological Systems," was given again by Dr. W. Paul to six students registered with the Institute of Bio-Medical Electronics.

Postgraduate Teaching

Members of our staff have contributed to the Advanced Postgraduate Course, the Refresher Course for Practising Pathologists, and the Postgraduate Course in Surgery. Dr. W. Paul has again been moderator of the popular Annual Course on Radioactive Isotopes.

A total of eight graduate students carried on work in the Department during the year. Miss S. Kovacs completed work for the M.Sc.; J. E. M. St. Rose and C. C. Liew earned Ph.D. degrees. Dr. St. Rose is this year's winner of the Stuart Alan Hoffman Memorial Prize. In 1967 we will initiate our first post-doctoral training programme specifically in Clinical Biochemistry.

Staff

It is a pleasure to record my gratitude to Professor J. A. Dauphinee who resigned the Chair last year to resume a more active research career. His unfailing support has been a great source of strength to the new Chairman. Dr. T. F. Nicholson retired at the end of the year and became Professor Emeritus after many years of service to the Department. During his career he achieved a wide reputation for his research on a variety of functions of the kidney. Although his astute mind has been lost from the local scene we are pleased that he has accepted, through the offices of External Aid, an appointment as Chairman of the Department of Pathology in the Medical School at Kaduna in Northern Nigeria. His previous experience at the University of Lagos has given him a sensitive understanding of the problems to be faced and we wish him every success in this new challenge. Professor W. Paul has continued to make a notable contribution to the work of the Department and the University. In addition to his teaching and research responsibilities, and his value as an adviser on biophysical problems, he has accepted the post as Graduate Secretary of the Department. Dr. R. A. Syed joined our staff as Lecturer during the year. With nearly fifteen years experience as a clinical chemist and a prime interest in method development he brings to the Department a field of research that has been somewhat neglected. Already he has developed a highly sensitive and specific automated procedure for the measurement of blood alcohol in which there will be considerable interest.

The heads of the department of Clinical Biochemistry in four major hospitals of the Faculty now hold cross-appointments as assistant professors in Pathological Chemistry. These include Dr. S. H. Jackson (Hospital for Sick Children), Dr. C. J. Porter (Toronto General Hospital), Dr. A. Rapoport (Toronto Western Hospital), and Dr. A. Malkin (Sunnybrook Hospital). Because of the growing importance and responsibility of the position occupied by each of them, and the contribution they have made and will be making to the development of the Department in the hospitals, promotion to the rank of Associate Professor has been recommended. Dr. B. Cinader (Princess Margaret Hospital) has made important contributions to the Department and has been promoted from Associate to the cross-appointment of Associate Professor in Pathological Chemistry. Dr. S. Dubiski (Toronto Western Hospital) has been promoted from Research Associate to Assistant Professor. Dr. H. C. Stancer (Clarke Institute of Psychiatry), formerly an Associate in Pathological Chemistry, has been promoted to the rank of Assistant Professor. Other promotions include Mr. M. O'Sullivan (St. Michael's Hospital) to the rank of Associate. Dr. D. Michener Schatz (Toronto General Hospital) to Associate, Dr. N. Husdan (Toronto

Western Hospital) to Lecturer, and Mrs. M. Kandel to the position of Research Associate in the Department.

New members of staff in 1967 will include Dr. N. Z. Stanacev, who comes from Harvard University as Associate Professor and brings to the Department a broad experience in the biochemistry of the phospholipids. A new appointment as Lecturer is J. G. Silah, M.D., who is completing his Ph.D. at McGill in the field of steroid endocrinology. We welcome also the cross-appointments of Dr. Alan Pollard (Head of Clinical Biochemistry at New Mount Sinai Hospital) as Assistant Professor, and Dr. R. R. Ogilvie (Toronto Western Hospital) as Lecturer in Pathological Chemistry.

Dr. C. C. Liew has been appointed a Post-doctoral Fellow in Pathological Chemistry for the coming year and Dr. R. W. Moore, from the University of Leeds, will take up a Post-doctoral Fellowship at Sunnybrook Hospital in the fall. Mrs. S. Bjerre (Toronto General Hospital) has been appointed Research Associate. We record with satisfaction that Dr. A. D. Baines, formerly of this Department, has been awarded a McLaughlin Travelling Fellowship for a year of post-doctoral study in Paris. He has accepted an offer to return to the senior staff of this Department in July, 1968.

Visiting lecturers during 1966–67 included Dr. H. Aebi from the Medizinisch-Chemisches Institut of Universitat Bern, Switzerland, Dr. W. Roman from the Institute of Medical and Veterinary Science, Adelaide, Australia, and Dr. George Weber, Professor of Pharmacology, Indiana University, U.S.A.

Finally I wish to report that our policy of establishing an academic home for biochemists in the hospital environment, where basic and medical qualified biochemists will have equal opportunity for career development, has met with wide approval. After a year as Chairman I am confident that on this basis it will be possible to attract the best available people of either background to the staff of the Department.

Research

Under Professor A. G. Gornall's direction, work on the pathochemistry of cardiovascular, endocrine, metabolic, and enzyme problems has continued. Dr. C. C. Liew completed for the Ph.D. degree a thesis entitled "Effects of Aldosterone on the Metabolism of Heart Muscle." He has shown that physiological quantities of aldosterone act specifically in this tissue to increase ATP production and RNA synthesis, and in some way to influence the flow of substrates from the glycolytic pathway into the Krebs cycle. Assisting in these studies have been Mr. F. H. Lee and a summer student, Mr. E. Watts. Miss S. R. Huang, candidate for the M.Sc. degree, is attempting to relate the metabolic effects of aldosterone to electrolyte changes in heart muscle. Mrs. B. J. Cadeau will be working toward a Ph.D. degree and has embarked on a study of Krebs cycle intermediates in heart muscle. Her initial objective of perfecting a gas-liquid chromatographic method for measuring these carboxylic acids has been achieved. Mrs. A. Matuk has undertaken as a summer project to study the effect of aldosterone on hydrogen ion metabolism in experimental diabetic ketosis. Miss S. Kovacs completed work for the M.Sc. last summer and submitted a thesis entitled "The Biosynthesis of Angiotensinogen by the Isolated Perfused Rat Liver." Final proof that the pressor substance released from the perfusate by renin is angiotensin has not been easy. Mrs. J. Grant has attempted with limited success to separate this peptide in pure form by column chromatography. Mrs. M. Kandel in collaboration with Dr. S. Kandel of the Faculty of Pharmacy, has begun a study of carbonic anhydrase with the objective of defining the active site of this enzyme. The protein has been isolated in extremely pure form and its amino acid composition determined. Firmly bound inhibitors tagged with carbon^{14} have been synthesized by Dr. Kandel. Following mild hydrolysis it is planned to study the molecular structure of the section of peptide containing the inhibitor. Mr. M. Luke has assisted with this project. In all this work the support of the Medical Research Council and the Ontario Heart Foundation is gratefully acknowledged.

Professor J. A. Dauphinee, with the help of the neurological staff of the Department of Medicine, has continued his investigations of copper metabolism in a variety of neurological conditions. One further case of Wilson's disease has been recognized but none of the many other somewhat similar neurological conditions investigated has been found to exhibit any abnormality of copper metabolism. With the help of Dr. W. Paul and Mr. D. Prior, a medical student in the third summer of his B.Sc. (Med.) programme, the techniques of atomic absorption spectrophotometry and of neutron activation analysis are being adapted to the investigation of trace metal metabolism in these and in other patients, with particular attention to the effect of the chelating therapeutic agent penicillamine on the urinary excretion not only of copper but also of zinc, manganese, and other trace metals. Mrs. A. Endrenyi has been measuring the amino acid excretion pattern in the urine of these patients with our new amino acid analyser. Mr. C. E. Downs has been investigating the arginase of red blood cells and, using Sephadex column chromatography, has succeeded in partially separating this enzyme from the great mass of hemoglobin protein present in these cells.

Professor W. Paul, in collaboration with Prof. N. F. Moody of the Institute of Bio-Medical Electronics, and with the technical help of Mr. M. Timanoff, has been investigating the physical properties of light image intensifer tubes and the associated gamma-ray scintillators with a view to the design and construction of a gamma-ray camera for clinical application. This investigation relies heavily on the recently acquired pulse height analyser provided by a Medical Research Council Grant. This research programme, which arose out of earlier completed research on brain scanning, is supported by the Ontario Cancer Treatment and Research Foundation. Another investigation has dealt with the applicability of a Canadian Armed Services earpiece for oximetry. This programme has demonstrated that the light detection system is quite accurately linear with light intensity and an amplifier system was constructed to complement the earpiece for the purpose of measuring the oxygen saturation of arterial blood. A study has been initiated into the colorimetric measurement of the degree of blanching in subjects with motion sickness. This work is being done in co-operation with Dr. W. N. Johnson of the Department of Otolaryngology.

Dr. R. A. Syed has developed an automated procedure for the measurement of blood alcohol levels that appears to be specific and is several times more sensitive than previous methods. This work is being supported by the Addiction Research Foundation. In collaboration with Professor Gornall an effort has been made to develop a more rapid and reliable method for the measurement of aldosterone in urine. Mr. J. Davidson has assisted with these projects, which are supported also by the Banting Research Foundation.

Professor S. H. Jackson has continued studies on the use of the radioisotope S^{35} to label proteins as a means of estimating protein metabolic turnover rates, particularly as related to protein metabolism in burns. He is collaborating with Dr. A. Sass-Kortsak of the Department of Pediatrics in studies on amino acid metabolic diseases, and with Dr. W. K. Lindsay of the Department of Surgery in studies on tendon healing. Under his direction Mr. T. Elliott (candidate for the M.Sc. degree) has studied urinary peptide hydroxyproline in burns.

Professor C. J. Porter has supervised the work of two candidates for the M.Sc. degree. Mrs. F. Bobik-Orchard is studying the isoenzymes of alkaline phosphatase. These are isolated by gel electrophoresis, characterized by enzyme kinetic methods and compared in normal individuals and in patients with various diseases. The objective is to define the patterns of these isoenzymes in sera and relate them to those obtained from liver tissue affected by different pathological processes. Mr. S. Cooper is attempting to determine the effects of various drugs on porphyrin biosynthesis in the photosensitive bacterium Rhodopseudomonas spheroides. Techniques for measuring the metabolic intermediates have been a major part of the investigation. Mrs. S. Bjerre has been an active and productive associate of Dr. Porter in the method development field.

Professor A. Rapoport, with the collaboration of Dr. H. Husdan, has completed a comparative study of three different methods of measuring serum and urine creatinine. This study also included a comparison of inulin clearance with creatinine clearance in the estimation of glomerular filtration rate both in health and disease. In collaboration with Drs. D. R. Wilson and G. N. Ranking, Dr. Rapoport has completed a study of the effect of prolonged renal artery stenosis on hypertension and the function of renal collateral circulation in the dog. This study included the effects of angiotensin infusions on the separate renal hemodynamics and electrolyte excretions both in normotensive and hypertensive dogs. With Drs. G. de Veber, G. N. Ranking, and C. R. McLean he has continued studies of a new clinical entity, focal proliferative glomerulonephritis, and has compiled biopsy, renal function, and immunological data on some twenty patients.

Professor B. Cinader has continued his highly productive studies on the regulation of the antibody response and these are described in detail elsewhere. Under his supervision J. E. M. St. Rose has completed a thesis for the Ph.D. degree entitled "Some Aspects of Acquired Immunological Tolerance to Molecularly Defined Antigens." Dr. S. Dubiski has collaborated in some of this work, as well as conducting his own research at Toronto Western Hospital, which also is reported elsewhere.

Miss Amy Britton, in collaboration with Drs. C. Ezrin and R. Volpe, has studied the peripheral binding of thyroxin and triiodothyronine as affected by estrogens and other hormones. In collaboration with Dr. E. Schonbaum and Dr. M. W. Radomski she has shown a direct relationship between free fatty acid and free thyroxin levels in serum.

Honours

Dr. B. Cinader has this year been elected President of the Canadian Society for Immunology. He has been made a member of the Editorial Board of the journal *Immunochemistry* and of the Immunology, Serology and Transplantation section of the Excerpta Medica Foundation.

Dr. S. H. Jackson was the titular member for Canada on the Commission on Clinical Chemistry of the International Union of Pure and Applied Chemistry.

Dr. C. J. Porter has been made Chairman of the Quality Control Committee and Secretary of the Certification Committee of the Canadian Society of Clinical Chemistry.

Dr. A. Rapoport has been made Associate Editor of the journal *Metabolism.*

Dr. D. M. Schatz has been made a member of the Editorial Board of the journal *Clinical Biochemistry.*

Dr. J. E. M. St. Rose has been awarded the Stuart Alan Hoffman Memorial Prize.

Scholarly Addresses

A. G. Gornall, "Assay of Aldosterone," the Upstate New York section of the American Association of Clinical Chemists, Oct., 1966. S. H. Jackson, "Homocystinuria and Cystinuria," lecture given in May, 1967, to the following local sections of the American Association of Clinical Chemists: Washington, Philadelphia, San Francisco, Seattle, Lincoln, Neb., Pittsburgh, and Detroit, Mich. C. J. Porter, "Blood Gas Analysis," the Ontario Society of Medical Technologists, May, 1967. A. Rapoport, "Common Renal Function Tests," the Upstate New York section of the American Association of Clinical Chemists, Oct., 1966.

Publications

Dauphinee, J. A. "Ray Fletcher Farquharson" (*Proceedings of the Royal Society of Canada*, Fourth Series, vol. 4, 1966, pp. 83–9).

——— "The Regulation of the Hydrogen Ion Concentration of the Body Fluids"; in *The Physiological Basis of Medical Practice*, by C. H. Best and N. B. Taylor, pp. 594–620. Baltimore: Williams and Wilkins. 1966.

Gangolli, S. and Nicholson, T. F. "The Determination of Blood Ammonia" (*Clinica Chimica Acta*, vol. 14, no. 5, Nov., 1966, pp. 585–92).
Gornall, A. G. "Some Curious Effects of the Hormone Aldosterone" (*Transactions of the Royal Society of Canada*, vol. 4, series IV, June, 1966, pp. 231–3).
Jackson, S. H. "Effect of a Nonionic Detergent on the Spectral Absorption of Oxyhemoglobin in the Presence of Bilirubin" (*Clinical Chemistry*, vol. 12, no. 8, Aug., 1966, pp. 509–12).
Liew, C. C. and Gornall, A. G. "A Model for the Action of Aldosterone in Heart Muscle" (*Program of the 49th Meeting of The Endocrine Society*, June, 1967, p. 142).
Moscarello, M. A., Sutherland, L. and Jackson, S. H. "Stimulation of C^{14} Glucosamine Incorporation into Plasma Proteins by Amino Nucleoside" (*Biochimica et Biophysica Acta*, vol. 127, no. 2, Oct., 1966, pp. 373–9).
Rapoport, A., Crassweller, P. O., Husdan, H., From, G. L. A., Zweig, M. and Johnson, M. D. "The Renal Excretion of Hydrogen Ion in Uric Acid Stone Formers" (*Metabolism*, vol. 16, no. 2, Feb., 1967, pp. 176–88).
Sereny, G., Rapoport, A. and Husdan, H. "The Effect of Alcohol Withdrawal on Electrolyte and Acid-base Balance" (*Metabolism*, vol. 15, no. 10, Oct., 1966, pp. 896–904).
St. Rose, J. E. M. and Cinader, B. "The Effect of Tolerance on the Specificity of the Antibody Response and on Immunogenicity. Antibody Response to Conformationally and Chemically Altered Antigens" (*Journal of Experimental Medicine*, vol. 125, no. 6, June, 1967, pp. 1031–55).

PATHOLOGY

Under the direction of Professor A. C. Ritchie

As in previous years, this report must begin by stressing the increasingly urgent need to increase the staff and facilities in the Department. We have neither the men nor the facilities to develop undergraduate teaching in the fashion demanded today, have not the men or time for good graduate and postgraduate programmes, and lack men and facilities to develop outstanding clinical services in the various teaching hospitals. Indeed, the facilities for the autopsy service in the Banting Institute are grotesque. One of our major tasks in the immediate future will be to develop in the Department the staff and skills needed in the challenging years ahead.

The undergraduate courses in General Pathology and Special Pathology for medical students have continued much as in the past. General Pathology was taught in the first two terms of the Second Medical Year by lecture and demonstration. The course was under the general direction of Dr. P. E. Conen. This year, most of the lectures were given by experts in their own field, with results that were not entirely satisfactory. The use of many lecturers destroyed the continuity of the course, and the varying complexity of the presentations offered difficulties to the students. The practical part of the course was taught in seminar groups with instruction based on microscopy or the presentation of specimens showing various types of lesion. Probably more time should be devoted to the microscopical sessions. In reducing the emphasis previously given to the study of microscopy, we have probably overshot the mark. Special Pathology was taught in the last two terms of the Second Medical Year by lecture, seminar, and demonstration, and throughout the Third Medical Year by lecture. Dr. J. B. Walter served as co-ordinator. The advantages of an integrated programme such as envisioned for the future are obvious. With the time available in the present curriculum, adequate discussion of the relationships between structure and function is not possible. Seminar teaching is very valuable at this stage, but demands relatively experienced teachers who have the time and motivation to give to this difficult assignment. The integration of the lecture courses in haematology given under the Departments of Medicine and Pathology was continued in the Third Medical Year, and again proved beneficial.

The course in General Pathology for dental students was directed by Dr. M. J. Phillips. The subject was presented by lecture and seminar, as in the past. As usual, it was not possible to provide seminar teachers of the seniority that would have been desirable.

The lecture course for students of Physical and Occupational Therapy was organized by Dr. Susan Ritchie. The Department also shared in the courses arranged by the Canadian School of Embalming and the Toronto Institute for Pastoral Training.

The heavy load of teaching under the Division of Postgraduate Medical Education continued. This year more than 200 hours of instruction was given by members of the Department. A great many shared in the work, but the load fell particularly heavily on Dr. W. Anderson. This aspect of the Department's responsibility is of considerable importance, and deserves reconsideration and development.

For the first time, a Refresher Course for Pathologists in Practice was organized under the auspices of the Division of Postgraduate Medical Education with the co-operation of the Departments of Pathological Chemistry and Bacteriology. Dr. H. T. G. Strawbridge served as moderator. The attendance was unexpectedly large, and the response most gratifying. It is hoped that the course can continue in future years.

The need to train many more pathologists to meet the requirements of the province and country becomes ever more extreme. Discussions have continued within the Department as to how recruitment of good men might be improved, and how our training programmes might be developed. Probably the time has come to consider introducing a more formal programme, perhaps patterned after the model of one of the existing diploma courses offered by departments in the Faculty.

In the School of Graduate Studies, the Advanced Course in Pathology was organized by Dr. P. E. Conen. Seven students were registered for the degree of Master of Science and five for the Doctorate in Philosophy. Three were successful in obtaining the degree of Master of Science.

Three students are continuing in the summer programme for the B.Sc.(Med.). One was awarded the degree.

We are glad to welcome several new members to the staff. Dr. J. D. Hamilton, Vice-President for the Health Sciences, rejoined the Department as a titular Professor. Dr. G. C. McMillan, Chairman of the Department of Pathology at McGill University, joined as a Professor. He is spending most of his time at present on a survey he is conducting for the National Heart Institute in Bethesda. Dr. J. F. Mustard, Head of the Department of Pathology in McMaster University, was reappointed as a Visiting Professor and has been assisting in the course in General Pathology and in research work. Dr. G. Simon has come from the University of Geneva as a Visiting Assistant Professor. He is continuing his work on ultrastructural pathology. Dr. F. A. Jaffé has long been a member of the Department, but has been appointed an Associate on leaving the Toronto Western Hospital to take up his new post as Medical Director at the Centre of Forensic Sciences. Dr. D. Pantalony was appointed Lecturer on his appointment as Haematologist to the Toronto General Hospital. Dr. J. H. N. Deck was appointed Assistant Pathologist at the Toronto Western Hospital.

Dr. M. Binns Smith has relinquished his post at the Wellesley Hospital to take up a new position in London, Ontario, and Dr. H. F. MacConnachie has left Sunnybrook Hospital to go to the Toronto East General Hospital. Dr. S. P. Rochlani has gone to a post in the University of West Virginia; Dr. H. Shinozuka to the University of Pittsburgh; Dr. Balis to the Loyola University; Dr. Erkman to the University of Chicago; and Dr. K. Arakawa has returned to Japan.

Among the many visitors to the Department during the year were Dr. P. Grunwald of the Sinai Hospital in Baltimore; Dr. M. Klemperer of Harvard Medical School; Dr. A. Engel of the Mayo Clinic; Professor P. Dustin of the Université Libre de Bruxelles; Professor I. Berenblum of the Weizmann Institute in Rehovoth; Dr. G. Crile, Jr., of the Cleveland Clinic; Professor J. V. Dacie of the Department of Pathology of the Royal Postgraduate Medical School; Professor Francis Camps of the Department of Forensic Medicine in the London Hospital; Dr. R. Ford, Chief Medical Examiner for Suffolk County, Massachusetts; and Dr. R. J. Lukes of Los Angeles.

Research

The research work of the Department continued actively, and is being extended. In the Banting Institute, facilities for tissue culture, radioautography, and chemistry were at last finished, though full use of the chemical laboratory has been hampered by the lack of equipment which it was expected would be provided by the Health Resources Fund. A new electron microscope has been installed in the Toronto Western Hospital, and it is expected that instruments will be added to other hospitals soon.

Dr. Ritchie with Dr. Shinozuka, Dr. Rochlani, and Mr. Zelcer has continued to study the initiating stage of carcinogenesis and the fine structure of the human breast. With Dr. Wigle and Dr. Marquis he has reviewed an unusual form of aortopathy.

Dr. Movat continued his work on the activation of the plasma kinin system by antigen-antibody aggregates. He isolated two groups of kinin-forming enzymes. One migrated on electrophoresis as a fast gamma-globulin, the other as do alpha-globulins. He also continued his studies on the biological activity of polymorphonuclear leukocytes *in vivo* and *in vitro*. A slow reacting substance has been found to be released by phagocytosing leukocytes. With Dr. Taichman and Dr. Freedman, it was shown that leukocytes were essential in the production of tissue injury and inflammation by microbacteria from gingival plaque material. The injury was associated with the phagocytosis of the bacteria and the release of their granules.

Dr. Taichman studied the role of lysosomes in the pathogenesis of various inflammatory states. Biochemical assays for the presence of various lysosomal hydrolases were conducted in experimental models of the local Shwartzman reaction, mixed bacterial infections, and haemorrhagic necrosis in the skin of rabbits infected with vaccinia virus. These observations were correlated with ultrastructural changes in the affected tissues. In addition, a study was made on the ultrastructural features of chronic gingivitis in humans.

Dr. A.-M. Jézéquel and Dr. J. W. Steiner continued their studies of infectious hepatitis *in vivo* and *in vitro*. Special attention was given to the normal and pathological ultrastructure of the Detroit-6 cell line. Contrary to previous reports, the alterations induced by inoculation of this cell line with material from hepatitis patients seemed to be non-specific.

The study of the effects of antibiotics on cells *in vitro* was continued. It was found that tetracycline induced profound mitochondrial alterations and inhibition of protein synthesis in whole cells. Both effects are dose-dependent. Some nucleolar alterations observed in tissue cultures have been related to the contamination of cultures by mycoplasmas (PPLO).

Dr. K. Miyai carried out electron microscopic studies on the rat liver in acute and chronic ethionine intoxication. In the acute intoxication, the fine structural components of the nucleoli became dissociated and dispersed and the granular component decreased in quantity. The nucleolar changes were associated with a paucity of cytoplasmic ribosomes. Administration of adenine, methionine, or both restored normal ultrastructural features. The nucleolar changes were interpreted as an expression of a disturbance in the formation of the precursors of ribosomes. In the chronic intoxication, the nucleoli showed at first changes similar to those found in the late stage of the acute experiment. Then, tightly and complexly organized nucleoli with relative paucity of the granular component appeared. This trend was reversed shortly prior to the cirrhotic phase. The nucleoli of neoplastic hepatocytes had strikingly abundant granular component.

Electron microscopic studies with radioautography on ethionine-treated tissue culture cells (HeLa) revealed nucleolar changes similar to those observed in the *in vivo* experiment.

Dr. P. Sadowski, in conjunction with Dr. G. R. Lawford and Dr. H. Schachter of the Department of Biochemistry, isolated polyribosome-like particles from the nuclei of rat liver. These particles were thought to contain newly synthesized RNA in transit from the nucleus to the cytoplasm. Dr. Sadowski has developed methods for

the isolation of nuclei and nucleoli from rat liver. The nuclei and nucleoli have been characterized with the electron microscope, and by biochemical and enzymatic analyses, and have been found to be morphologically intact and free of contamination. Two classes of polyribosomes have been isolated from the nuclei, polyribosomes from the outer nuclear membrane, and polyribosomes from the interior of the nucleus. The second class of particle appears to originate from the non-nucleolar regions of the nucleus.

Dr. Phillips continued studies of human liver and intestinal biopsies by light and electron microscopy and by histochemistry. Emphasis has been placed on the liver in cirrhosis and in various metabolic disorders such as glycogen storage disease, fructose intolerance, Whipple's disease, etc. The findings of remarkable ultrastructural alterations in a patient with fructose-1-phosphate aldolase deficiency led to an experimental study of rats under conditions of fructose loading in collaboration with Dr. G. Hetenyi, Department of Physiology. The effects of other hexoses, glucose analogues, and insulin were also studied. The electron microscopic changes in jejunal biopsies in intestinal malabsorption states was begun. With Drs. Unakar and Adachi an experimental study on glycogen-endoplasmic reticulum relationships was continued.

Dr. K. Givan carried out studies on infectious canine hepatitis virus *in vivo* and *in vitro*. The morphological changes were correlated with the production of infective virus, as determined by virus isolation techniques. Specimens of dog liver first yielded virus on the third day after inoculation, at which time virus particles could first be demonstrated by electron microscopy. Maximal histological changes occurred on the fourth day, when intranuclear virus particles and non-viral intranuclear paracrystalline formations were noted. A selective extraction of the viral coats and of the non-viral paracrystals was observed when epon-embedded sections were treated for one hour with 0.5% pepsin. A continuous line of dog kidney cells, when infected synchronously with virus, yielded progeny virus 16 hours after infection. This was also the time when progeny virus was first noted by electron microscopy. Virus yield was maximal between 24 and 48 hours after inoculation. By 48 hours most cells contained intranuclear virus particles and non-viral intranuclear paracrystals. As in liver tissue, both the viral coats and the paracrystals were extracted by treatment of sections with 0.5% pepsin for one hour.

Dr. Silver commenced studies on platelet morphology and behaviour with particular reference to a system of microtubules in the platelet cytoplasm and the behaviour of platelets in cholesterol-fed rabbits.

Dr. L. Taichman investigated the degenerative changes which ultimately result in cell death in tissue culture cells infected with enteroviruses and tried to elucidate the mechanism of the cytopathic effects. Puromycin was used in an attempt to prevent protein synthesis. Four hours following infection, viral synthesis could not be completely blocked. The lowest dose of Puromycin able to achieve a complete inhibition of viral replication was 10μg/ml. When Puromycin was added at selected dose and time, the cytopathic effects of the virus were prevented. As well, the cytotoxic effect of Puromycin itself is reduced to a significant degree. Electron microscopic studies confirm these observations and reveal that a limited virus replication does occur in Puromycin-treated cells. The few viral crystals thus formed are associated with fine fibrillar strands, the nature of which is under investigation at the present time.

One incidental finding is the presence of virus particles in the nucleus of the cells infected with Coxsackie B/5 virus. All attempts to eliminate a possible contaminating virus have been unsuccessful. These nuclear particles do not appear when the Coxsackie B/5 is inhibited with specific antisera. The possibility that the replication of Coxsackie B/5 may involve an intranuclear phase deserves further investigation.

Dr. W. Anderson with Dr. N. Delarue has studied the behaviour of alveolar cell carcinoma in patients treated at the Toronto General Hospital, and has studied the effect on prognosis of a modified radical mastectomy in cases of carcinoma of the breast. With Dr. Peters, they have also re-evaluated the value of adrenalectomy and hypophysectomy in cases of carcinoma of the breast.

Mrs. Marie Crookston has continued her investigation of the specificity and behaviour of "cold" auto-antibodies.

Dr. C. Ezrin with Dr. D. Lesk has studied further the fine structure of the human adenohypophysis. The Crooke's hyaline change produced in a sub-type of basophil by excessive circulating hydrocortisol has been found to be characterized by a fine fibrillar appearance that is not visible with light microscopy. Using the aldehyde thionin P.A.S. stain, Dr. Fred Rosen investigated the embryology of the thyrotrophic basophil sub-type. It was found to stain differently from the other basophils only after the twelfth week of foetal life, corresponding to the time of onset of thyroid function as evidenced by trapping of radio-iodine. Mrs. Margaret Evans has been studying the insulin-binding capacity of antibodies to insulin found in patients with insulin-resistant diabetes, using modified dextran coated charcoal technique to separate "free" from "bound" insulin. The capacity to bind insulin does not appear to be related consistently to the insulin requirements of the patients. Anti-insulin anti-serum obtained from immunized guinea pigs shows a much greater binding capacity than serum from the most resistant human subjects.

With Dr. Balis, Dr. Conen continued electron microscopic studies of lung samples from human and animal foetuses and young infants, using a special technique to demonstrate the alveolar surface lining layer. Lung biopsies taken before and after heart "pump" operations on children and experimental procedures on calves and dogs were compared. Previous studies of BAPN-induced lesions in rat aorta were continued by exposing these animals to diets rich in butter fat or corn oil. Ultra-structural studies of tumours were found useful for the classification of some tumours. With Dr. Erkman, Dr. Conen found chromosomal abnormalities in 12 of 32 marrow samples from children with acute leukaemia. A translocation type of abnormality was found in 4 of the cases, and 8 were aneuploid. In 3 of the latter patients and in 4 adults, evidence of clonal evolution of karyotype was found. Dr. C. D. Bell completed a study of changes in fibre size and of the incidence of various histopathologic changes in 84 cases of Duchenne muscular dystrophy.

Dr. Katz and Dr. Willans found no evidence that the formation of circulating antibody or the release of L-asparaginase contributed to the regression of the Walker 356 tumour in rats.

Dr. Strawbridge has continued his work on the classification of nephritis. Dr. Abbot with Dr. I. Koven has investigated the possible clinical use of the fibrinolytic enzyme CA-7.

Dr. Young is leading a co-operative study to determine the value of the units used to measure laboratory work in hospitals in Canada, and to suggest modifications.

Dr. Ross with Mr. Smialowski completed a teaching film of the conduct of an autopsy.

DIVISION OF NEUROPATHOLOGY

As was the case last year, the lectures in neuropathology were deferred until the beginning of the Third Medical Year, but because no time is available for practical work in the Third Medical Year, a preliminary set of demonstrations was given towards the end of the Second Medical Year.

The postgraduate programme was continued, with emphasis on both rounds and seminars. It has proved very valuable in the training of residents.

The service load of the Division remains very heavy. Even to maintain our present standing an increase in staff is urgently needed.

Research

Dr. J. G. Humphrey, Dr. L. Heffernan, and Dr. N. B. Rewcastle have collaborated in a study of experimentally induced myopathies in animals and certain human muscular disorders. Profound myopathies have been produced in rabbits by the administration of varying doses of cortisone and the detailed changes have been followed by biopsies at specified time intervals. Though necrotic muscle fibres are abundant, they are capable of complete regeneration in that at 4–6 weeks following

cessation of steroids, histologically the muscles appear normal. Currently under way are experiments aimed at an attempt to determine which of the cells are responsible for the regeneration and what effect intermittent steroid administration has on the ability of individual skeletal muscle fibres to regenerate, the latter perhaps a rare example of a late onset rod myopathy in the human. In addition, a rare example of a late onset rod myopathy has been examined in great detail as providing further evidence that rod myopathy is not an entity confined to the young, but may occur in older patients and present as a progressive disorder. Two examples of primary amyloidosis have also been investigated from the ultrastructural point of view. Dr. R. S. McPhedran has been completing his study of the ultrastructural changes occurring in polymyositis. Dr. D. McGee is at present studying the ultrastructural changes occurring in nerve biopsies obtained from a patient with Charcot-Marie-Tooth disease.

Dr. H. Hoffman with the assistance of Dr. Jit Kim Lim has been studying the effects of steroids on induced elevations of intracranial pressure. Dr. N. B. Rewcastle is continuing a study on permeability within the central nervous system in particular to particulate material introduced into the subarachnoid space and its uptake by the surface of the brain, vessels within the subarachnoid space, and the choroid plexus. This study is primarily an ultrastructural study supplemented by both light microscopic and ultraradiographic techniques. Some aspects of human nervous system disorders have also been investigated. Dr. M. Ball is completing an electron microscopic study of intracytoplasmic neuronal argyrophilic inclusions which are the hall-mark of Pick's disease. He has shown these structures to be a third example of abnormal aggregates of neurone tubule-like structures within the neuronal cytoplasm. Dr. Rewcastle, in collaboration with Dr. Wherrett, has studied the ultrastructural appearance of the intracytoplasmic deposits occurring in a case of Gaucher's disease. Dr. T. Gray is completing the light microscopic study of an atypical case of Parkinsonism; it is an example of striatonigral degeneration with the unusual association of olivopontocerebellar degeneration.

Honours

Dr. Ritchie was elected President-elect of the Canadian Association of Pathologists. Dr. Rewcastle is Secretary of the Canadian Association of Neuropathologists and representative to the International Society of Neuropathology. Dr. H. T. G. Strawbridge was elected a Fellow of the Royal College of Physicians of Edinburgh. Dr. Heidi Patriquen was awarded the Congress Award of the Canadian Association of Radiologists. Dr. Conen was elected Chairman of the Section of Pathology of the Academy of Medicine, Toronto. Mrs. Crookston was President of the Ontario Antibody Club.

Scholarly Addresses

Dr. Ritchie spoke on tumours at McGill University and on aortopathy to the American College of Physicians. Dr. Movat spoke on the activation of the kinin system by antigen-antibody complexes at the IIIrd International Pharmacological Congress in Brazil and on mechanisms in passive cutaneous anaphylaxis to the same body. Dr. Donohue addressed the Paediatric Pathological Society of Great Britain and Ireland in Sigtuna, Sweden, on lesions of the central nervous system associated with inborn errors of amino acid metabolism, and spoke to the Pediatric Pathology Club on the same subject. Dr. Jézéquel presented a paper on electron microscopy of liver biopsies from patients with hepatitis at the third meeting of the International Association for the Study of the Liver in Tokyo, and spoke to the Federated Societies on mitochrondrial alterations induced by tetracycline. Dr. Phillips spoke on the subcellular pathology of hereditary fructose intolerance to the Royal College of Physicians and Surgeons of Canada and to the annual meeting of the International Academy of Pathology. Dr. Unaker spoke to the American Association of Anatomists on the relationship between glycogen and endoplasmic reticulum in foetal liver. Dr.

Conen addressed the American College of Physicians on chromosomes in neoplasia and spoke to the Ontario Cancer Foundation on the same topic. He spoke to the Ontario Association of Pathologists on chromosome studies in malformations and retardation. Dr. Sadowski gave a paper on the isolation of ribosomal particles from the nucleus at the meeting of the Federated Societies, and Dr. Givan one on studies on canine hepatitis virus. Dr. Taichman spoke to the Federation meeting on lysosomal activity in the Shwartzman reaction, and to the Canadian Dental Association on the activation of the kinin system by antigen-antibody complexes. Dr. Rosen spoke on the embryology of the thyrotroph to the American Thyroid Association, and on endocrine aspects of trans-sphenoidal hypophysectomy to the Royal College of Physicians and Surgeons of Canada. Dr. Sepp spoke on unexpected deaths from natural causes at the course for coroners and took part in the symposium on the epidemiology of drug-resistant infections at the sixth Interscience Conference on Antimicrobial Agents and Chemotherapy. Mrs. Crookston served on a panel on serological aspects of blood transfusion at the 11th Congress of the International Societies of Haematology in Sydney.

In the Division of Neuropathology, Dr. Rewcastle presented a paper on Alexander's disease to the Canadian Association of Neuropathologists and was a visiting lecturer at Queen's University. Dr. Hunter spoke to the Royal College of Physicians and Surgeons of Canada on metastatic neoplasms of the brain. At the second Canadian Congress of Neurological Sciences Dr. Heffernan spoke of rod myopathies and Dr. Gray on Parkinsonism and striato-nigral degeneration. Dr. Peerless spoke on Hippel-Lindau's disease to the Canadian Association of Neuropathologists.

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PHARMACOLOGY

Under the direction of Professor W. Kalow

Teaching commitments of the Department have not changed much since last year. However, the continual effort to improve the quality of instruction has led to some reorganizations and particularly to the extensive use of the tutorial system in the laboratory course for medical students. The students were invited to submit criticisms and suggestions for further improvement. As in previous years, in spite of some increase of permanent staff, the Department had to rely on the engagement of part-time help to fulfil its teaching obligations. Because of recurrent illness of Professor Lucas, no special course in toxicology was offered during the session. Staff members who accepted special responsibilities in organizing major courses were: Professor H. Kalant (Advanced Pharmacology), Professor F. A. Sunahara (Pharmacology for Students of Dentistry), Professor G. E. Johnson (Pharmacology for Students of Pharmacy), Professor W. H. E. Roschlau (Laboratory Course in Pharmacology for Medical Students), and Professor W. A. Mahon (Clinical Pharmacology Conferences in collaboration with the Department of Medicine). Professor E. Schönbaum took responsibility for the care of graduate students in his capacity as Graduate Secretary of the Department.

The growing summer student programme has proved to be of benefit to both the students and the Department. Increased University and Extramural support for this programme is gratefully acknowledged. Extramural support: Burroughs Wellcome & Company (Canada) Ltd., CIBA Company Limited, Pfizer Company Limited, and Geigy (Canada) Ltd.

During the session it was a pleasure to welcome Drs. C. H. Hockman, W. A. Mahon, W. H. E. Roschlau, A. K. Sen, and T. T. Zsoter, who all joined the staff in the rank of Associate Professor. These appointments imply a considerable broadening of interests in the Department. Drs. W. A. Mahon and T. T. Zsoter have cross-appointments in the Department of Medicine and are acting as clinical pharmacologists. It is hoped that Clinical Pharmacology will be further strengthened in the future.

Dr. L. Endrenyi has joined the Department as Research Associate specializing in biomedical applications of mathematics, and particularly of statistics. The Department maintains for the Faculty a newly installed time-sharing computer terminal to a General Electric-265 computer. This also serves as a comparatively simple tool in introducing members of the Faculty to programming and computational techniques.

Planning for the new curriculum to be introduced in 1969 represented a major effort for many members of this Department as it has for other members in the Faculty of Medicine.

The expansion of the Department is illustrated by the enlargement of the space occupied. In the latter part of 1966 the section under Professor Kalant and the laboratories of Professors A. K. Sen and P. D. Cooper were moved to the fifth floor in the Pharmacy Building. While this meant some relief from crowding, it also meant that departmental space was distributed over four different buildings on the campus, not counting the limited hospital space available for clinical pharmacology. In spite of this increase, space is still too limited to permit the recruiting appropriate for teaching in the new curriculum.

Research programmes in the Department are numerous, as shown in the follow-

ing account. Nevertheless, a weakness of this Department in comparison to some of the top schools on this Continent is the relative lack of postgraduate research assistants. Some review of the means of support in this area is urgently needed.

We are indebted to the Laboratory of the Attorney General of the Province of Ontario, to the Defence Research Medical Laboratories, and to the Alcohol and Drug Addiction Research Foundation, for the provision of facilities, staff, or both. The help of these organizations is greatly appreciated.

Graduate students have completed the following theses: for the M.Sc. degrees, Wing C. Chan, "Biosynthesis of Catecholamine in a Cold Environment"; Norman S. Calof, "Influence of Chlorpromazine on Catecholamine Secretion"; Thos. H. Holmes, "Clinical Pharmacology: A Discourse on the Study of Drugs in Man"; William Grose, "Neurotropic Drugs and Cerebral Acetylcholine"; Ken Ryan, "A Method of Determining the Electrical Properties of Synaptic Vesicles."

Scholarly Addresses

Professor W. Kalow, on topics related to pharmacogenetics, to students and interested staff at McGill University, Montreal, University of Texas, University of Illinois; at a symposium on "Genetics in Medical Practice," United States Children's Bureau, Washington, D.C.; at a symposium on "Basic Sciences Related to Anaesthesia" at A. Einstein College, New York; on "Relaxants" at Canadian Anaesthetists Society Meeting, Montreal, Que. He has been invited by the New York Academy of Sciences to organize with Professor B. LaDu of New York an Anniversary Symposium of the Academy on Pharmacogenetics, and by Vanderbilt University, Tennessee, to be a member of guest faculty for a "Workshop on Clinical Pharmacology."

Professor E. Schönbaum, on "Role of Sympathetic Nervous System in Acclimation to Cold" at Seminar, Space Sciences Research Center, University of Missouri, Columbia, Mo.

Professor G. E. Johnson, on "Influence of Low-Environmental Temperatures on the Actions of Drugs" at the International Congress of Biometeorology, Rutgers University, New Jersey.

Professor H. Kalant, on "Cellular Effects of Alcohols" at the International Congress on Alcoholism, Santiago, Chile, August, 1966; on "Alcoholism Training in Basic Science Areas" at a panel meeting on "Alcoholism: New Trends in Education," American Psychiatric Association, 123rd annual meeting, Detroit, Michigan, May, 1967.

Research

In the section under Dr. W. Kalow, Dr. Beverly A. Britt started studies of malignant hyperpyrexia, a study stimulated by and conducted in close collaboration with the Department of Anaesthesia. The investigation represents an attempt to elucidate the (perhaps hereditary) factors which occasionally cause a patient to respond to general anaesthetics with a fatal rise of body temperature. The initial attempt is to find animal models and to search for biochemical abnormalities in patients who have survived such an episode.

Mr. I. Gallimore started the study of butazolidin metabolism in different individuals since enzyme induction of liver microsomal enzymes is known to play a major role in the elimination of this compound in animals. Mrs. Eva Chow studied the susceptibility of different hereditary types of human plasma cholinesterase to inhibition by organophosphates. Miss Patricia Gurr as a student investigator succeeded in making neuromuscular endplates visible in exposed skeletal muscle of anaesthetized rats. This should permit a study of micro-circulation through the neuromuscular endplate. Mr. Arnold Katz is exploring reactions between heavy metal complexes and quaternary ammonium compounds in the hope of creating a new means of detecting the localization of acetylcholine in histological preparations.

Dr. T. H. Holmes started a study of the reaction of patients to adrenaline and

other catecholamines in relation to their levels of steroid hormones. The support of his efforts by the Departments of Medicine and Pathological Chemistry is gratefully acknowledged.

In Professor E. A. Sellers' and Professor E. Schönbaum's section, studies of the actions of thyroid-stimulating substances continued actively. This year, the group has been joined by Professor C. F. Francis, a Colombo Plan Fellow, who has successfully demonstrated the presence of thyrotropin-releasing factor as well as the thyrotropin itself in the hypothalamus. Mrs. M. L. Desbarats Schönbaum and Dr. Sellers continue their investigation of the modes of action *in vitro* of very small concentrations of thyrotropin and long-acting thyroid stimulator (a serum factor found in certain patients with Graves' disease). Dr. E. Schönbaum continues his collaboration in clinical studies of these substances in health and disease. In collaboration with Dr. M. Radomski of the Defence Research Medical Laboratories, Downsview, Ontario, and Miss A. Britton, Department of Pathological Chemisty, University of Toronto, Dr. E. Schönbaum started a study of the effects of varying serum free fatty acid levels on the amount of free thyronine in serum. The existence of the Toronto Thyroid Group, an informal association of clinicians and experimental biologists from several hospitals and departments, has proven a stimulating and helpful influence in all of these investigations.

Dr. E. Schönbaum also continued studies of the effects of immunosympathectomy on sympathetic nervous activity. A study has been started, in collaboration with Professor Rita Levi-Montalcini, Washington University, St. Louis, Mo. (the discoverer of nerve growth factor and immunosympathectomy), on the effects of prolonged cold exposure on sympathetic ganglia. With Dr. G. Steiner of the Department of Medicine, University of Toronto, Dr. E. Schönbaum is now investigating the effects of immunosympathectomy and acclimation to cold on lipid metabolism and non-shivering thermogenesis.

The addiction research group, under the direction of Professor H. Kalant, has extended its investigation of the mechanisms of action of, and acquisition of tolerance to, alcohols and other drugs affecting the nervous system. (Metabolic tolerance, indicated by increased hepatic oxidation of ethanol, was shown previously, and the mechanism of the increase has been explored further.) Mr. D. Haist is examining the starch gel electrophoretic pattern of rat liver alcohol dehydrogenase, and its *in vitro* kinetics, preparatory to isolating the pure enzyme from control and alcohol-treated rats. Professor J. Khanna is simultaneously examining the kinetics of crude enzyme preparations from alcohol-treated animals. He is continuing his study of nucleotide levels in various tissues of chronic alcohol animals and, with Dr. E. R. Tustanoff of McMaster University, is examining the distribution of isotope from labelled ethanol, glucose, and pyruvate, in various intermediary metabolites in the tissues of these animals.

The mechanism of production of chronic alcoholic fatty liver is being studied by Mr. G. Bustos and Dr. Khanna.

In collaboration with Dr. R. J. Gibbins of the Addiction Research Foundation, Mr. A. E. LeBlanc has tested a new instrument devised for accurate measurement of minor degrees of intoxication in small animals, and has shown a high correlation of impairment with blood alcohol level. He is exploring the acquisition and later loss of nervous system tolerance to ethanol in chronically treated rats. With Dr. Khanna, he has shown that the instrument also measures barbiturate effect with high sensitivity and precision. Mr. I. Laufer and Mr. A. Chaiton have studied the activation of cerebral ATPase activity by prolonged frozen storage, and the effects of alcohols on the activated preparation.

Mr. W. Grose concluded a study of the effects of alcohols and barbiturates on the release of acetylcholine from brain cortex slices, and found unexpected differences between the drugs. Brain slices from alcohol-tolerant animals were found to be refractory to the *in vitro* effect on acetylcholine release. To explore the basic mechanism further, Mr. K. Ryan has devised methods for measuring the electrical

charge on the acetylcholine-containing vesicles from nerve endings, preparatory to studying drug effects on the release of their contents.

Miss M. Guttman has examined the effects of metronidazole (a possible therapeutic agent for alcoholism) on the activities of alcohol and acetaldehyde dehydrogenases of rat liver.

Professor C. H. Hockman has continued his study, begun in Richmond, Va., of the production of cardiac arrhythmias and of salivation by electrical stimulation of various sites in the central nervous system, and of drug effects on these responses. These studies are revealing interesting differences among ethanol, chlordiazepoxide, and other agents, with respect to their sites of central action, as well as basic information on the central control of autonomic nervous activity. Methods have been set up for the study of animals with chronically implanted brain electrodes, and drug effects on evoked potentials in man. It is hoped to develop this laboratory into an active Brain Research Centre.

Professor E. Llewellyn-Thomas is conducting his research in the Institute of Biomedical Electronics. Reports on his activities are contained in the report of the Director of that Institute.

Professor T. T. Zsoter and Professor W. A. Mahon commenced their work in Clinical Pharmacology. Facilities for this work are gradually being developed in the Toronto General Hospital and the Toronto Western Hospital (cf. the report of the Department of Medicine).

Studies in the field of autonomic physiology and pharmacology have continued in the laboratory of Professor G. E. Johnson. Research involving the interaction between the thyroid gland and the sympathetic nervous system has demonstrated that under conditions of cold exposure a decrease in thyroid activity results in an increase in sympathetic nervous system secretion. Interesting results have been obtained in attempts to replace the normal sympathetic nerve transmitter noradrenaline with a structurally similar but foreign compound, metaraminol. Following its injection, metaraminol is taken up by sympathetic nerve replacing noradrenaline and is released by nerve stimulation in a manner similar to noradrenaline. In collaboration with Dr. Schönbaum, studies were made of the effects of nerve growth factor anti-serum on the secretion of the sympathetic nervous system.

Studies in the section under Professor F. A. Sunahara established that vasodepressor material extractable from the rabbit renal medullary tissue are primarily of the prostaglandin family of substances. These substances, when purified, have selective smooth muscle-stimulating and relaxing effects and extremely potent vasodepressor activity. In the rat, successful hypertensive models were produced by several methods. However, the quantitation of vasodepressor material from kidneys of normal and hypertensive animals has been fraught with difficulties and so this work is still not complete at present.

To investigate the mode of action of Prostaglandins in the intact cardiovascular system, it was necessary to develop a reliable method to estimate cardiac output in small animals because of the very limited supply of prostaglandins currently available. The modification of the prostaglandin effects by other drugs is being studied. It is hoped that these approaches will provide useful data from which the physiological role of prostaglandins and the mechanism of action with respect to the control of circulation might be elucidated. Generous research support received from the Ontario Heart Foundation and the Ayerst Research Laboratories (Montreal) is gratefully acknowledged.

The laboratory under Dr. A. K. Sen has been set up for Biochemical techniques of investigation. In collaboration with Dr. T. Tobin and Mrs. Shirley Wong, work has progressed actively to establish the reaction sequence of $(Na^+ + K^+)$–dependent ATPase isolated from guinea pig kidney cortex. The experiments with the cardiac glycoside ouabain indicate that this enzyme undergoes conformational changes in different ionic environments. The mechanism of action of ouabain as an inhibitor of the active Na^+ and K^+ transport across the cell membrane can be explained from

these findings. Dr. Tobin has nearly perfected the technique of isolation and perfusion of the giant axon from lobster central nervous system. Once perfected, this technique will be employed to confirm the intermediate steps of the reaction sequence deduced from studies of the $(Na^+ + K^+)$–dependent enzyme system. This technique will be employed to investigate the effects of various pharmacological agents to elucidate their mechanism of action at the membrane level. Solubilization and purification of the $(Na^+ + K^+)$–dependent ATPase from the guinea pig kidney cortex is in progress with the assistance of Miss Linda Buell.

In Professor M. A. Kumar's section, studies on the nature of changes in calcium homeostasis and formation of bones in chronic calcitonin deficiency were completed. Progress was made in estimation of the hormone in plasma. A method for studying histidine decarboxylase activity in gastric mucosa was developed and is being exploited for further studies on the biochemistry of gastric secretory control.

In Professor P. D. Cooper's laboratory, research has included a study of the effects of enzymes on the response of isolated organs to drugs, the synthesis and psychopharmacological investigation of a mescaline analogue, and development of a new bioassay for psychoactive agents.

Publications

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PHYSIOLOGY

Under the direction of Professor R. E. Haist

The Department of Physiology has had an active year in research and teaching. Two new members were added to the professorial staff. The number of departmental members with cross-appointments in clinical departments and members of clinical departments with cross-appointments in physiology is increasing. This provides the most direct liaison between the basic science and clinical departments and is of special importance when such appointees are involved in teaching in both the basic science and the clinical areas.

In all classes this past year there were 1,875 students, 741 of whom were in laboratory classes. In addition, there were 20 graduate students and 7 post-doctoral research trainees in the Department. New approaches in undergraduate teaching are being tried and closed-circuit television combined with video-tape recordings are under test. The video-tapes of special demonstrations provide a valuable supplement to the laboratory work. The use of video-tapes in relation to the practical examinations also seems promising.

Because of the large numbers of students, multiple choice, computer-marked examinations are being used to a greater extent throughout the term. One interesting experiment tried this year in collaboration with the Departments of Pathology and Pharmacology related to term examinations. In the second medical year, the term examinations in these subjects were combined into one.

There is great need for better means of day-to-day assessment of the student activities and some experiments assisting in this are being tried.

Many distinguished scientists visited the Department, the following presenting lectures or seminars: Dr. Ivan Bihler*, University of Manitoba; Dr. J. Q. Bliss*, McGill University; Dr. R. DeMeyer, University of Louvain, Belgium; Dr. J. W. Pearce*, University of Alberta; Dr. Robert Steele*, Brookhaven National Laboratory, N.Y.; Dr. A. C. Burton*, University of Western Ontario; Dr. John Kraicer, Queen's University; Dr. Lawrence Power*, Wayne State University; Dr. Leslie Duncan, University of Edinburgh; Dr. J. J. Faber*, University of Oregon; Dr. E. R. Arquilla, University of California, Los Angeles; Dr. Harald Sonnenberg, University of New Mexico.

The Department is greatly indebted to a number of honorary members who assist in undergraduate and graduate teaching: Dr. Stanley Hartroft, Dr. Donald Fraser, Dr. Julio Martin, and Dr. Langford Kidd of the Research Institute of the Hospital for Sick Children; Dr. Walter Johnson of the Department of Otolaryngology; Dr. K. Money of the Defence Research Board; and Dr. A. T. Storey of the Faculty of Dentistry. Dr. J. Archibald has given valuable help in relation to the animal care.

The research activity of the various members of the Department has been high. The various projects are summarized briefly in the next part of the report.

With the increasing amount of time devoted to committee work in connection with curriculum changes and other matters, and the paper work associated with surveys by federal and local agencies, questionnaires, and so forth, it is becoming increasingly difficult to preserve the essential conditions for the peculiar and necessary activities of the scholar and investigator. One of our chief concerns in a large institution must be to maintain the atmosphere in which individual creative activity can flourish.

Scholarly Addresses

Professor W. S. Hartroft on "Alcohol and the Liver" to The American College of Physicians, Ann Arbor, Michigan; on "The Effect of Dietary Factors in

*Seven of these lectures were under the Visiting Lecturers Programme of the School of Graduate Studies. In addition, special lectures were given by Dr. John Logothetopoulos, Dr. C. K. Gorman, Dr. George Steiner, Dr. Julio Martin, Dr. M. Knoblauch, and Dr. F. C. Monkhouse.

the Development of a Fatty Liver" to the Symposium on Fatty Liver, Erlangen, Germany; on "Nutritional Deficiencies and the Liver" to the VI International Congress, International Academy of Pathology, Kyoto, Japan; on "The Pathogenesis of Cirrhosis" to The American College of Physicians, Ann Arbor, Michigan; on "Pathogenesis of Fatty Liver and Cirrhosis: Histological Approach" to the International Symposium on Alcohol and Alcoholism, Santiago, Chile; on "Protein Requirements in Young Saimiri Sciureus (Squirrel) Monkeys" to The American Society for Clinical Nutrition, Atlantic City, N.J.

Professor J. M. Martin on "Experimental Atherosclerosis and Diabetes" to the VII Latin-American Congress of Physiology, Mar del Plata, Argentina.

Professor A. M. Rappaport on "The Hepatic Artery, its Structural Circulatory and Metabolic Functions" to the International Association for the Study of the Liver, Toky-Kyoto, Japan.

Professor O. V. Sirek on "Plasma Free Fatty Acid and Glucose Concentrations in Houssay Dogs Following a Single Injection of Growth Hormone" to the The American Physiological Society, Houston, Texas; on "The Effect of Growth Hormone on Carbohydrate and Fat Metabolism" to the Department of Physiology, Lankenau Hospital, Philadelphia, Pa.; on "The Colony of Chinese Hamsters of The Charles H. Best Institute" to The Brook Lodge Conference on Spontaneously Diabetic Animals, Augusta, Mich.; on "The Role of Growth Hormone in the Glucose-Fatty Acid Cycle" to the Division of Endocrine and Metabolic Diseases, Veterans' Administration Hospital, Los Angeles, Calif.; on "Metabolic Studies in Houssay Dogs" to the Department of Medicine Division of Endocrine and Metabolic Diseases, University of Southern California, Los Angeles, Calif.; on "Identification of Hemopexin in Sera of Infants of Diabetic Mothers" to the Department of Obstetrics and Gynecology, University of California, Los Angeles, Calif.; on "Serum Proteins in Newborn Infants of Diabetic Mothers" to the Workshop on Diabetes, Seigniory Club, Montabello, Quebec.

Research

In Professor R. E. Haist's section, work has been continuing on factors influencing the secretion of insulin and its carriage in blood. Professor J. K. Davidson, with Mrs. Judith Coddling, Miss Marcia Zeigler, and Professor M. A. Ashworth, has studied the rate of disappearance of insulin activity from acid-alcoholic–treated serum in depancreatized animals. They found that the half-life of this activity was about 25 times as long as the half-life of injected I^{131} insulin. Dr. Davidson found also that insulin obtained from the coypu was non-neutralizable with anti-beef insulin antibody. This is the second nonneutralizable mammalian insulin found so far. With Dr. M. A. Ashworth the rate of insulin appearance and disappearance and degradation of I^{131} insulin in thoracic duct lymph and plasma was studied. Dr. Davidson and Mrs. Coddling have investigated the uptake of I^{131} insulin by the diaphragm and certain factors that influence this. He has also collaborated in clinical studies with Dr. Barbara Hazlett of the Department of Medicine on the rates of disappearance of injected I^{131} insulin and its correlation with levels of insulin activity in treated serum in normal and insulin-treated subjects. Dr. Davidson's group has collaborated with Dr. A. M. Rappaport and Dr. B. Lin in studies of absolute rates of insulin secretion in a pancreatic remnant (see later).

Dr. B. Lin with Dr. J. Hunter has been studying insulin secretion in response to glucose in hypothermic dogs and with Dr. C. C. Yip has been studying the insulin activities of fractions obtained by sucrose gradient ultracentrifugation from pancreases of duct-ligated animals. In relation to this problem Dr. Lin has been investigating methods for the preparation of isolated pancreatic islets.

Professor J. Hunter, who joined the Department this year, in addition to collaborating in the work on hypothermia and insulin mentioned above, has set up his laboratory and is actively engaged in promising studies on experimental hypertension.

In Professor J. Campbell's section, Dr. Krishna Sudha Rastogi recently found

that growth hormone administered daily increased the rate of secretion of insulin and caused sustained elevation in insulin levels in blood, with marked alterations in blood and tissue composition, indicative of diabetes. The mode of action of growth hormone in producing these effects is now being explored, particularly the interrelations with other hormones, with Dr. Rastogi and the assistance of Mrs. V. Lazdins and Mr. G. R. Green. Effects of hypophysectomy on the responses to growth hormone and on the rate of uptake of insulin are being studied. Effects of adrenalectomy on responses to growth hormone were studied, in co-operation with Dr. G. Hetenyi. Adrenal cortical hormones were found to increase serum immunoreactive insulin levels in animals, and effects of adrenal hormones and of growth hormone, separately and combined, in adrenalectomized animals are being examined.

Dr. Yoshima Tasaka studied the nature of pancreatic glutathione-insulin transhydrogenase, an enzyme that destroys insulin. The A and B chains of insulin and an insulin hydrolysate, in low concentrations, were found to inhibit the enzyme strongly. From this investigation, a procedure has been evolved for the determination of the rate of release of insulin from pancreatic tissue. Research is now directed to study of the factors that influence, stimulate, or inhibit the release of insulin from pancreatic tissue *in vitro*.

Dr. Jose Pierluissi is investigating the influence of insulinase inhibitors on the action of insulin *in vivo* and on tissues *in vitro*.

Most of the work in Professor G. J. Hetenyi's section has been concerned with mechanisms maintaining glucose homeostasis. D-ribose has been shown to inhibit the normally increased rate of glucose production in hypoglycaemia or during phlorizin-induced glycosuria. This work has been carried out with the help of Dr. K. Ishiwata. Mr. J. Cowell has assisted in the study of the importance of the sympatho-adrenal system in the maintenance and restoration of the normal blood sugar level. The turnover of lactate and the transformation of glucose to lactate in normal and diabetic dogs are being investigated by Dr. N. Forbath. In collaboration with Professor J. M. Phillips, of the Department of Pathology, some aspects of fructose intolerance, and with Dr. L. Endrenyi of the Department of Biometrics, theoretical questions of tracer methodology, are being investigated.

Professor F. C. Monkhouse, with Mrs. Susan Milojevic, Mrs. B. Stevens, and Mr. David Purdon, has continued to study the physiological importance of antithrombin. By the use of column chromatography on DEAE cellulose, using Tris buffer and varying sodium chloride concentration for elution, an antithrombin fraction free of albumin and having high specific activity has been obtained. Using this product, studies are now in progress to establish the enzymatic characteristics of antithrombin and to study ways of increasing or decreasing its activity. With Mrs. Stephanie Meredith, Mr. Roger Holmes, and Miss Adrianne Schmitt, studies are now being carried out to investigate the importance of mucopolysaccharides on the fibrinolytic system, and thus the influence of these compounds on thrombosis and atherosclerosis.

In collaboration with Mr. C. R. Cowan, Professor Monkhouse also continued studies on the induction of platelet thrombi *in vivo*. A thirty-minute film has been completed on this project. An investigation into the effectiveness of low molecular weight dextrans on the prevention of platelet thrombi formation is in progress.

Dr. Alan Horner, with the assistance of Mrs. Donna Coles, has collaborated with Dr. Monkhouse's section in studying the properties of naturally occurring mucopolysaccharides, and in preparing these compounds for biological studies.

In Professor A. M. Rappaport's section the results of the study, together with Drs. G. A. Wrenshall, M. Vranic, J. Campbell, Mr. G. R. Green, and J. S. Cowan, of the effects of hepatic arterial ischemia on survival and metabolism of partially and totally depancreatized dogs have been summarized and submitted for publication. Research was continued along similar lines with Drs. M. Knoblauch, T. Kawamura, J. Campbell, and G. A. Wrenshall. The consequences of arterial ischemia were compared with those of venous ischemia in the liver.

The effects of drugs and metabolites on the portal and hepatic arterial circulation were determined simultaneously with electromagnetic flowmeters by Dr. Rappaport in co-operation with Professors N. F. Moody, E. Lewellyn-Thomas, Mr. S. Zelin, and Mr. J. Henderson. Mr. S. Zelin and Dr. M. Knoblauch measured the decrease in portal flow in rats after the ingestion of a single dose of Fulvine, an alkaloid causing veno-occlusive disease in Jamaican children. These findings were corroborated by the *in vivo* observation and cine-photography of the hepatic microcirculation, hour by hour after the ingestion of Fulvine.

Dr. Rappaport, in co-operation with Drs. Kawamura, J. K. Davidson, B. J. Lin, R. E. Haist, and Mr. S. Zelin, determined blood flow and insulin output per minute of an isolated portion of the pancreas.

In Professor Margaret Henderson Santalo's section, investigation of the relationship between glucose metabolism in liver and such hypoglycemic agents as insulin and phlorizin was continued in rats. Hypoglycemia produced by insulin, but not that produced by phlorizin, is accompanied by an increase in the glucose space of liver, and this increase can be prevented by infusion of the rats with sufficient glucose to offset the hypoglycemia. The infusion of large quantities of glucose in the presence of either insulin or phlorizin decreases the glucose space to about the same low level. Phlorizin injected together with insulin, while producing a greater hypoglycemia, tends to diminish the increased glucose space produced by insulin alone. The effects of sympathetic blocking agents on these changes in liver-glucose produced by hypoglycemia are now being studied.

In the section of Professor O. V. Sirek and Professor Anna Sirek, emphasis was placed on metabolic studies in endocrinologically deficient animals, especially Houssay dogs. In collaboration with Drs. A. Niki, H. Niki, and A. Bucalossi, the effect of a single injection of growth hormone on plasma free fatty acids and free amino acids was investigated. It was found that the initial "insulin-like" effect, consisting of a reduction of the concentration of plasma free fatty acids and free amino acids, occurred independently from the action of insulin and it was possible to suppress it under certain conditions by a pharmacological blockade of the adrenergic system. Cutaneous and aortic tissue of pancreatectomized, hypophysectomized, and Houssay dogs, and skins of spontaneously diabetic Chinese hamsters, were fractionated for glycosaminoglycans. These studies were carried out by Dr. H. MacKay and Miss M. Loughney. The results of this investigation, though still in its preliminary phase, indicated that hormonally induced alterations of mucopolysaccharide patterns were different in skin and aorta.

In Professor M. Vranic's laboratory, the rate of endogenous insulin secretion was determined by matching it with *intraportal* insulin infusions, in partially depancreatized conscious dogs, immediately after removal of a remnant pancreatic autograft. As evidenced by the tracer-determined rates of glucose production and utilization and by concentration measurements, the secretion rate approaches 12 mU/kg/hr. Metabolic studies using tracers (in collaboration with Professor G. A. Wrenshall) and measuring individual free fatty acids by gas chromatography (in collaboration with Professor A. Kuksis) continue on such dogs and on the effects of exercise in normal and depancreatized dogs and the relation between the rates of glucose production and nitrogen excretion during fasting. The studies on the effects of portal *versus* non-splanchnic glucagon infusion, in normal and partially depancreatized dogs, and on the tracer-determined rates of glucose production and utilization on levels of fatty acids in plasma, continued with Mr. P. Fono.

In Professor J. W. Scott's section, Mr. Kenneth Marshall has continued the study of the electrical activity of individual semicircular canals, implanting electrodes in branches of the eighth cranial nerve of the cat. Mr. James Love is undertaking a study of the cortical evoked responses in the cat produced by sensory stimuli. Dr. Neville Russell has been investigating the regeneration of neurones across a transection of the spinal cord. Mr. Timothy Hughes extended the studies of cortical evoked responses in the assessment of hearing in the newborn. Dr. Lim Jit Kim has studied the objective measurement of disability due to Parkinson's disease.

Professor L. Organ has been engaged in the measurement of electrical impedance in the cat brain and in studying factors influencing the trans-membrane potential of frog cardiac fibers. The effect of hypoxia on the electrocardiogram of the foetal lamb is also being investigated.

Professor D. Crapper, a newly appointed member of the Department with a cross-appointment in Medicine (Neurology), has established his laboratory and is actively working on the effects of certain specific degenerative changes in neurones.

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PSYCHIATRY

Under the direction of Professor A. B. Stokes
(July 1, 1966 – December 31, 1966)

The academic year 1966–1967 has been of great moment to the Department of Psychiatry. On May 18, 1966, the Clarke Institute of Psychiatry was officially opened by the Prime Minister of Ontario, in association with the Minister of Health and the Minister of Public Works. On June 13, 1966, the Academic Opening of the Department of Psychiatry in the Clarke Institute was celebrated in the presence of distinguished psychiatrists from Britain, the United States of America, and Canada. The ceremonials, extending over three days, were fitting symbols of the evolution of Psychiatry in the Toronto community and academic matrix.

First, the Clarke Institute itself has come into functional being as a consequence of a most liberal University Hospital agreement, strongly implemented by a forceful informed Board of Trustees. The arrangements for hospital services and staff organization ensured a practical realization of the ideal that patients with psychiatric illness shall be eligible for treatment on their own recognizances like any other person suffering organic disease in a general hospital.

Secondly, the housing of the Department of Psychiatry in the Clarke Institute warranted the use of exemplary services for the purposes of education and research in the field of mental disorder. The usage was the seal of University interest and influence.

Thirdly, as a symbol of the transitional quality of present-day psychiatry, nine academic lecturers gave thoughtful attention to new objectives, needs of change, and technological advances of importance to psychiatry.

Finally, the Presidential dinner, honouring the Department of Psychiatry, the conferring of an honorary degree on Sir Aubrey Lewis as a most distinguished psychiatrist, and his address to Convocation were academic precursors of momentous effort to develop psychiatry both as a body of knowledge and as a practice of medicine.

There can be no doubt that staunch effort and skilful discernment of changing patterns will be imperatives in the field of education, perceived as a socio-political institution. Every university department must be a trustee of knowledge, that it be stored for use, that it be communicated, that it be developed. But the primary issue of effective organization is to attain a balance between services, teaching, and research, where each asserts a priority need.

The psychiatric services of the Clarke Institute are developing strongly under the able administration of Dr. C. A. Roberts, the Executive Director. They include special units in addition to general clinical activities: the child and adolescent service, under Dr. E. J. Rosen, has made full use of its new quarters and has broadened its approaches to the problems of the young; the forensic services, under Dr. R. E. Turner, have continued to develop close relations with both the courts and the community; a mental health service under Dr. S. Freeman has been initiated in

liaison with the East York–Leaside municipality; the beginnings of a psychosomatic service have been inaugurated and the speech clinic has continued. A distinctive service feature is the provision of a clinical investigation unit, where medical scientists may explore specific clinical problems in the areas of their research. These and other lively service activities fostered by the Clarke Institute have allowed the closest working relationship with other than medical disciplines—nursing, social work, sociology, psychology, occupational therapists, child care workers, educators, and the like. The fact of such relationships is now common to all psychiatric clinical services, but here the emphasis is on the quality of interaction, so important to the over-all educational and research attitudes towards the development of psychiatry in an era of eclecticism.

Apart from the clinical services of the Clarke Institute the psychiatric units of the teaching general hospitals have made headway. These units, working together and individually, have assumed full responsibility for high standards of service and for educational and research activities in their respective hospitals, under the over-all direction of the University Department of Psychiatry. Much strengthening of staff will be required but an increase of strength is already apparent and will continue further in the climate of new opportunity.

Other service connections of the Department of Psychiatry include a working relationship with the Ontario Hospital, Toronto, the University Health Service, the University Advisory Bureau, the Toronto Mental Health Clinic, the West End Creche, and the Mental Retardation Centre. These connections make up a network of service which, when used in teaching, provide an over-all experience for graduate students in the psychiatric specialty.

The network organization of teaching by the University Department of Psychiatry was the subject of enquiry and inspection by the Royal College of Physicians and Surgeons of Canada. The Royal College examinations are the qualifying tests of specialist standing and cover the content of four years of graduate study. The University examinations for the Diploma in Psychiatry are taken after three years of resident assignments, leaving a fourth year for concentration in one or other particular aspects of psychiatry before the Royal College finals.

The complex issues of undergraduate and graduate education are resolved in the Department of Psychiatry by reference to the Board of Teachers, which includes all of the officially appointed teaching staff, both medical and non-medical. Strong committees have worked hard at the various problems, oftentimes, where appropriate, in liaison with committees of the Medical Faculty. The senior members of the Department have constituted a Reference Committee to advise the Chairman where policy matters have been urgent and pressing.

The Undergraduate Committee (chairman Dr. A. J. Preston), apart from the administration of undergraduate instruction and examinations, has been concerned with two primary areas—the teaching of the Behavioural Sciences in the first two years of the medical course, and the setting up of an appropriate examination after the two years of study. The issues are being tackled on the basis of the new systems teaching organization of medical instruction, with Dr. Bruce Quarrington as systems chairman in the Behavioural Sciences component of the new curriculum.

The Graduate Committee (chairman policy Dr. K. G. Gray; chairman executive Dr. W. J. Stauble) has been mainly concerned with improving the central courses of instruction in terms of a step-by-step development of psychiatric concepts and applications. As Director of Education, Dr. W. J. Stauble has carried a large load of academic administration, has provided a useful reference resource, and has initiated some studies of the educative process. He has organized a symposium on group therapy and a conference on graduate education. In addition Dr. Stauble has been personally responsible for the Trinidad project—the development of psychiatric services and education in collaboration with the Trinidad authorities and the Canadian Department of External Affairs.

The Committee on Child Psychiatry (chairman Dr. E. J. Rosen) has co-ordinated the educational activities of University-affiliated clinics working with children and adolescents as a psychiatric sub-specialty.

The Committee on General Hospitals Psychiatry (chairman Dr. R. Pos) has worked hard to identify the particular problems associated with education and research in the psychiatric divisions of the teaching general hospital. A brief prepared by the committee has been a most useful pointer to future objectives in an unfolding academic scene.

A committee concerned with distinguished visiting lecturers (chairman Dr. A. L. Jones) has provided a deal of stimulant to the common fare. Professor Bruce Sloane, Chairman of the Department of Psychiatry, Temple University, and Dr. D. Ewen Cameron, President of the World Psychiatric Association, have given lectures and conducted seminars as two-day contributions to the graduate programme. Of particular interest and importance was the visit of Professor Iurii Saarma, Professor of Psychiatry and Legal Medicine in the University of Tartu of the Estonian S.S.R. The visit was on an exchange arrangement organized by the Centre for Russian and East European Studies (Dr. Gordon Skilling and Dr. Richard W. Judy). Although the arrangement was based on the Clarke Institute, opportunity was realized to bring about an exchange of ideas on a wide front and with involvement of many University groups concerned with services, research, and educational developments. Dr. Saarma extended his visit to the University of Western Ontario, McGill University, and the University of Montreal to obtain an over-all picture of Canadian practices.

As befitting a university department a committee (chairman Dr. A. Bonkalo) has been vigilantly concerned with library facilities. The Farrar Library, administered and financed by the Clarke Institute, has been a great boon to students, teachers, and researchers of the Department of Psychiatry. Dr. C. B. Farrar, Professor Emeritus, visited the library in the summer, an occasion of great pleasure both to the Institute and the Department.

In connection with library development the Board of Trustees of the Clarke Institute has announced its support of a Clarke Institute monograph service; each publication will represent high quality exploration in the many areas of study that make up the work of the Clarke Institute.

The senior staff has contributed to academic developments in other centres than Toronto. In particular, Dr. C. A. Roberts, Associate Professor, was invited to deliver the First C. M. Hincks Memorial Lectures as Visiting Professor in the University of Ottawa: very appropriately he chose as his subject the Primary Prevention of Psychiatric Disorders. Dr. Mary Jackson, Associate Professor, was re-elected as Advisory Fellow to the World Federation of Occupational Therapists for a second term of five years. Dr. J. D. Atcheson, Assistant Professor, was a member of a consulting team, working for the Department of National Health and Welfare, among the Eskimos of the Eastern Arctic.

Congratulations are due to Mr. Cyril Greenland (Ontario Mental Health Foundation travelling fellowship) and Dr. Gregory Brown (Ontario Mental Health Foundation research fellowship). Of past diplomates two were successful in the Royal College Fellowship examinations; nineteen obtained their specialist certificates.

In short the first half of the academic year 1966–1967 has been an exciting venturesome time for the Department of Psychiatry leading up approximately to the stimulus of the Canadian centennial year. Many profound changes have come about and others will continue to evolve in the Department's organization. Thanks and praise are due to every member of staff and many fostering supporters for both patience and initiative at a time of uneasy transition from older concepts to newer ideals.

Under the direction of Professor K. G. Gray
(January 1, 1967–June 30, 1967)

A striking fact in the current academic year is the emerging role of the Faculty of Medicine as a force in the integration of the functions of the various teaching hospitals. The rapid expansion of the medical school necessitates an expansion of the staff, buildings, and facilities of the teaching hospitals. The increase in expenditure of public funds makes some central control inevitable.

A measure of control can be exercised by the office of the Dean in co-operation with the governing bodies of the hospitals, the hospital administrators, and the chairmen of the departments in the Faculty of Medicine.

These developments are apparent in the Department of Psychiatry. Money received from the University, the Ontario Hospital Services Commission, the Ontario Mental Health Foundation, and other granting bodies will be channelled through the Chairman of the Department to the Clarke Institute of Psychiatry and the other teaching hospitals. An opportunity thus arises to develop and integrate the psychiatric facilities in the whole network of teaching installations. This development has been facilitated by the transfer from the Department of Medicine to the Department of Psychiatry of the University budget for the employment of psychiatrists.

The introduction of state health insurance has necessitated changes in the structure of the Department of Psychiatry. The fact that all patients are able to pay their medical bills necessitates changes in the pattern of medical practice in teaching hospitals. This was anticipated in the establishment of the Clarke Institute and from its inception on July 1, 1966, a medical partnership was formed. This appears to be a satisfactory arrangement for the collection and distribution of medical fees in a teaching institution.

During the latter half of the academic year distinguished lecturers and visitors included Professor John A. Clausen, Department of Sociology, University of California, Dr. Milton Greenblatt, Department of Psychiatry, Tufts University, Boston, and Dr. Oscar Schmalzbach, Department of the Attorney General, Sydney, Australia.

The Department of Psychiatry and the Division of Rehabilitation Medicine, through the Division of Postgraduate Medical Education, organized a seminar and workshop on Projective Object Relations. It was held at the Clarke Institute of Psychiatry on May 4, 5, 6, 1967. The guest course conductor was Professor Fern Azima, Department of Psychiatry, McGill University. There were 56 registrants for the course.

There were 14 successful candidates for the Diploma in Psychiatry. Dr. S. A. Dziurdzy was awarded the Gold Medal. The Senate gave approval to lengthening the course of study for the Diploma in Psychiatry from two to three years, beginning in the session 1966–1967. It follows that the diplomates who were successful this year will be the last group to be included in the two-year course.

The Chairman and members of the Department welcome the appointment of Professor Robin Hunter as Chairman of the Department, commencing July 1, 1967.

Scholarly Addresses

Dr. C. A. Roberts, Associate Professor, delivered the First C. M. Hincks Memorial Lectures as Visiting Professor in the University of Ottawa, "Primary Prevention of Psychiatric Disorders," February 2–4, 1967.

Research

Reported by Professor J. W. Lovett Doust

The opening of the Clarke Institute of Psychiatry a year ago provided a splendid stimulus and orientation to psychiatric research in the Department. For some investigators, the site of their enquiries was a matter of transfer from the cramped quarters of the Toronto Psychiatric Hospital to the exemplary wards and sectional laboratories of the Clarke Institute; for others, the facilities of the new buildings permitted entirely new directions to be pursued and resources to be tapped. During this year of its first renewed operation, a sense of excitement and rededication has run through the research group; new lines of enquiry have opened up, new channels and patterns of communication have been probed, new relationships established. Throughout the Department zest has been added and this catalyst bids fair to improve the quality and creativity of research psychiatry in the Department. Some examples of new and old lines of enquiry will serve to underline these

remarks and it would be proper to commence with reference to the work of the various research sections newly established at the Clarke.

One such section is that of Community Studies, under the direction of Dr. D. B. Coates. With an over-all orientation toward social psychiatry and the social determinants of behaviour, this section has begun to organize a number of investigations in these general areas. One such has been Dr. F. Allodi's study of the illness experience of the Italian community in Toronto. Another is the selection of the Borough of East York as a geographic area in which data collection could be carried out. To review this possibility a seminar was held in the fall of 1966 at which a round dozen consultants representing psychology, sociology, epidemiology, social work, demography, and even criminology gathered to discuss the "Yorklea Project" and the practical ways of surveying the population involved. As a result of this planning, deadlines have been established and it is evident that much will be heard of the progress of this work in the coming months. Liaison with Dr. S. Freeman, head of a community service on the clinical side of the Institute, enables "Yorklea" psychiatric patients to participate in the full range of community services and provides the project with clinical facilities.

In the research section of social pathology, Dr. J. W. Mohr's research on Sexual Behaviour and the Criminal Law was carried further in terms of analysis of data (Dr. Mohr), legal studies (Mr. Gigeroff), and bibliographical review (Miss Wildridge). The five-year follow-up was initiated and completed, and its analysis is the last outstanding item in this project.

A volume on the legal studies (Mr. Gigeroff) is ready for publication, and another volume on patterns of sexual offences (Dr. Mohr) is in preparation. This work has been carried on under Dr. K. G. Gray as principal investigator, and with Dr. R. E. Turner as consultant.

In addition, the section has co-operated with Dr. C. K. McKnight in his study of homicide, and has given consultation to Dr. E. W. Mandryk in his study on the married homosexual.

The major research programme of Dr. B. Quarrington's psychological research section this year has been the study of young children in their earliest phase of stuttering. The research objectives here have included the identification of parent behaviour and attitudes which differentiate the parents of stuttering children from parents whose children do not stutter. Additionally, the data will be used to identify characteristics of children in whom stuttering will not dissipate in their first year after the onset of stuttering.

Dr. D. Paitich continues his interest in investigating the diagnostic and prognostic utility of systematically collected case history material dealing with parent relations and social development in a wide range of psychiatric patients.

Collaborative research efforts continue with Drs. H. Stancer, B. Cookson, and H. Moldofsky in the serial study of a range of patients believed to display periodic features in their symptomatology.

The development of a computer-based system for the automatic scoring and interpretation of psychological test data continues to be pursued by psychologists from the Clarke Institute together with psychologists from other hospital settings. Research data are being collected which will form the basis of a rule structure to govern the output of interpretive statements.

The psychophysiological research section under Dr. J. W. Lovett Doust has completed a study of redox potential measurements in patients with schizophrenia. Reports of significant abnormalities could not be confirmed. Work on capillary photomicroscopy with Mr. J. Mourant has been extended to patients with psychosomatic diseases. With Mr. I. Podnieks, the critical flicker fusion series effect has been studied. Longitudinal measurements extending over many months have revealed a close relationship with the patient's changing psychological state. With Mr. L. Keltz, development has begun on a complex battery of EMG, EEG, and autonomic sensors with which it is hoped to monitor vigilance in human subjects.

In the neurochemical research section, under the direction of Dr. H. C. Stancer,

Dr. P. S. Sastry is completing the study of blood and cerebrospinal fluid lipids in some groups of mental retardation and comparing them with the values obtained for normal children of various age groups. It is of interest that the values found for CSF lipids are lower than those which have been reported in the literature. Dr. Sastry has found, in the blood of one Tay Sachs patient, the same abnormal ganglioside which has previously been found in the brain, suggesting that this might be a confirmatory diagnostic test in some cases of this disease. Mrs. J. Czarnocki with Dr. Sastry has compared the lipids of human and beef pineal glands and found no differences. However, the sphingomyelin appears to be different than that in other tissues. This work will be reported at the first International Neurochemical Society Symposium in Strasburg.

In the Clinical Investigation Unit, under the direction of Dr. H. C. Stancer, Dr. W. A. L. Lyall has devised a method for the continuous measurement of blood cholesterol which was reported at the Technicon Symposia in New York and Paris. The method is now being applied to *in vivo* analysis to determine the effects, if any, of stress on cholesterol.

Dr. Lyall and Dr. B. Quarrington have developed a "Behaviour Check List" for measuring the psychological state of patients longitudinally. This was reported at the American Psychiatric Association meeting held in Detroit.

A telemetric system is being set up in collaboration with Mr. B. Smith to measure EEG, pulse rate, respiration, temperature, and EKG in ambulatory patients.

As part of an international study, patients with recurrent depression and manias are being investigated to determine the efficacy of Lithium treatment. A number of physiological and chemical parameters are being matched against the psychological state.

It has been found in one longitudinal investigation that methyl dopa or Aldomet, which is commonly used for treatment of hypertension, is an effective psychopharmaceutical for treating a cyclic affective disorder. In collaboration with Professor G. Johnson of the Department of Pharmacology, the catecholamines are being analysed longitudinally in recurrent affective states to determine particularly whether noradrenaline plays an active part in the aetiology of these states.

The research interest of Dr. H. Moldofsky on the investigation ward at the Clarke has been spasmodic torticollis. Dr. Moldofsky has continued his psychosomatic investigation of patients with rheumatoid arthritis at the Wellesley Hospital.

In the clinical services of the Clarke, the erstwhile hope expressed at the opening exercises of the Institute that the climate of research should invest every bed and every clinical effort has not been forgotten. References have already been made to some of these efforts. To them should also be added the clinical research enquiries of Dr. P. H. Melville in connection with the procedures of milieu therapy. With Dr. R. C. Cochrane data have been collected on patients in Adult Service C and analysed to show the effects of patients' self-government. A paper entitled "The Therapeutic Democracy" will be presented at the summer meeting of the Canadian Psychiatric Association in Quebec City.

Finally, the Clarke Institute has been host to several research groups throughout the year. One of these is that headed by Dr. R. Pos who directs an active programme concerned with informational underload: a possible mechanism of hallucinations. Dr. Pos has been sponsored mainly by the Department of Medicine but the Clarke has been delighted to offer him research facilities in the neurophysiology research section while his own Banting Institute laboratories were being equipped.

Outside the Clarke, Dr. H. R. Alderton's work at Thistletown Hospital is worthy of mention. The difficult task of measuring behaviour parameters in nursery school children has been a major effort but he has also conducted a third drug screening trial of imipramine as a treatment of enuresis in children.

At the Ontario Hospital, Toronto, research has attempted to keep pace with progress elsewhere. With financial support from the Ontario Mental Health Foundation, Dr. J. Dukszta has enquired into the type and extent of behavioural change

which may be expected from milieu therapy applied to the population of a ward of chronically disturbed patients. The Foundation has also supported Dr. Lovett Doust's ongoing investigation of cerebral blood flow in psychiatric patients. This programme is based on the O.H. Research Unit and seeks to establish the role of rheoencephalography as an index of blood flow and employs the varieties of psychiatric diagnosis as one of the variables for investigation. With Dr. B. Cookson, a series of neuroendocrinological investigations has been pursued on patients in the research ward of the Unit. Emphasis on the measurement of certain of the sex steroids led Dr. Cookson to the use of clomiphene citrate as a possible therapeutic agent in some recurrent affective disorders. With Mr. L. Huszka, gas liquid chromatograph studies have been made to fractionate the 17-ketosteroid of a female patient with periodic catatonia into seven different fractions and to measure pregnanediol.

Publications

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——— "Let's Take another Look at Unmarried Parenthood in Canada" (*The Social Worker*, vol. 34, no. 3, July, 1966, pp. 194–8).

——— "Three Pioneers of Canadian Psychiatry" (*Journal of the American Medical Association*, vol. 200, no. 10, June 5, 1967, pp. 833–42).

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RADIOLOGY

Under the direction of Professor R. Brian Holmes

The new functional organization of the Department initiated a year ago has involved many members in active planning over a broad range of subjects. Much time is being devoted to the undergraduate curriculum, at both the pre-clinical and the clinical levels. The course leading to the Diploma in Medical Radiology enjoyed its largest registration on record. Its curriculum is under critical review, with changes having taken place this year and planned for the future. During the past year under the direction of Dr. Donald Wood, Department of Medicine, a lecture course in Nuclear Medicine began, and has been made an integral part of the Radiology training programme. The possibility of developing a degree course in Radiology is currently under consideration.

In respect to attempts to increase the involvement of the Diagnostic Division in research activity, the Department has been fortunate in arranging consultations with Professor Vincent P. Collins of Baylor University, Houston, Texas, Consultant in Radiology to the National Academy of General Medical Sciences, Washington.

Unfortunately, the continuing shortage of potential staff, relative to service demands, continues to be a severe problem, and to interfere with the proper academic function of the existing Faculty.

All in all, the past year has shown a gratifying increase in academic interest and activity, and we are fully confident that this will continue and grow.

Dr. J. D. Munn has resigned from the Department as Assistant Professor and Radiologist-in-Chief, Hospital for Sick Children.

During the year, the Department has been pleased to welcome the following visitors: Professor W. P. Cockshott, Ibadan University of Nigeria; Professor Vincent P. Collins, Baylor University; Dr. M. Dufresne, University of Montreal; Dr. Robert Egan, Emory University; D. John W. Hope, University of Pennsylvania; Dr. Harold Jacobson, Albert Einstein Institute; Dr. M. D. Sachs, Western Reserve University.

THERAPEUTIC RADIOLOGY

The Ontario Cancer Institute has many affiliations with the University of Toronto. First, the Princess Margaret Hospital, which is incorporated within the Ontario Cancer Institute, is one of the teaching hospitals of the Faculty of Medicine of the University of Toronto, and members of its permanent staff hold appointments in one or more departments of this Faculty.

The Princess Margaret Hospital was primarily established for the care and treatment of patients with malignant disease by radiotherapy, but other non-surgical treatments, such as hormone therapy or chemotherapy, are employed as indicated.

The radiotherapists on the staff largely comprise the Department of Radiotherapy in the Faculty of Medicine. Furthermore, the more senior members of the staff of the Division of Biological Research and the Division of Physics of the Ontario Cancer Institute hold appointments in the Department of Medical Biophysics of the Faculty of Medicine. This Department, by agreement with the University of Toronto, is housed in the Ontario Cancer Institute. Many of the senior members of this department also hold appointments in other departments of the University of Toronto, some of which are in the Faculty of Medicine and some in other faculties.

The Princess Margaret Hospital is recognized by the Royal College of Physicians and Surgeons of Canada, for complete training in Therapeutic Radiology, for two years in Pathology, for one year in Internal Medicine, and for six months in Diagnostic Radiology. The hospital is also recognized for training in Therapeutic Radiology by the American Board of Radiology.

Undergraduate Teaching

At the present time this consists of five lectures given to the final year. With the revision of the curriculum it is expected that members of the Department will take considerably greater responsibilities in this area. In addition, one lecture and weekly clinics are given to the final year in the Faculty of Dentistry.

Postgraduate Teaching

During the current year, seven students were registered for training in Therapeutic Radiology, and plan on spending total periods of from one to three years at the Princess Margaret Hospital. Of these two are taking the first year and one is completing the second year in the D.M.R. course. One of the first-year students is supported by the Colombo Plan.

Honour

Dr. C. A. F. Moes was elected to membership of the Association of the University Radiologists.

Scholarly Addresses

During the year 1966–1967, in addition to routine duties, members of the staff gave lectures and papers to other than local groups as follows:

W. E. C. Allt, "Therapeutic Use of Radiation," Symposium on the Non-Surgical Treatment of Cancer, Mount Carmel Institute, Columbus, Ohio.

F. A. Beale, "Experience in the Princess Margaret Hospital in the management of Neoplasms of the Testes, Kidneys, Ureters and Bladders" and "Lymphography," Urologic X-Ray Conference, sponsored by Department of Surgery, College of Medicine, Cincinnati General Hospital, University of Cincinnati, Cincinnati, Ohio; "Management of Carcinoma in Situe, Carcinoma of Corpus Uteri and Ovarian Malignancy," Symposium on Cancer (with Gynaecological Travellers from British Isles), University of Toronto.

R. F. Colapinto, "Renal Arteriography," Canadian Association of Radiologists, Toronto, March 1967.

J. W. Davidson, "The Current Status of Lymphography," Canadian Association of Radiologists, Toronto, March, 1967; Society of Pathologists, Toronto, April, 1967; "Lymphography with Particular Reference to the Lymphomas—Radiological Aspects," Ontario Medical Association, Toronto, May, 1967; "Radiographic Appearances in Chromolymphadenography," Clinical Research Society of Toronto, February, 1967.

J. H. Gardiner, "Diverticulum of the Mitral Valve," The Canadian Association of Radiologists, Toronto, March, 1967.

N. V. Hawkins, "The Survival of Normal Haematopoietic and Lymphoma Colony-Forming Cells Exposed to Continuous and Fractionated Gamma Radiation over 24 Hours in Mice," Radiation Research Society, Puerto Rico; "The Use of Radiation in Malignant Disease and Chemotherapy," North Peel Medical Society.

R. B. Holmes, "Venous Disorders of the Lower Extremity: Radiological Diagnosis," Queen's University, Kingston, September, 1966.

A. Humphry, "Neural Crest Tumours in Infants and Children," Canadian Association of Radiologists, Toronto, March, 1967.

E. L. Lansdown (panel), "Renovascular Hypertension," Canadian Association of Radiologists, Toronto, March, 1967; with Drs. H. E. Aldridge and E. D. Wigle, Department of Medicine, "Diastolic Mitral Insufficiency," Canadian Association of Radiologists, Toronto, March, 1967.

J. L. McIntyre, "A Simplified Evaluation of the Performance of the Rectilinear Tomograph," Canadian Association of Radiologists, Toronto, March, 1967; "Double Contrast Meniscography," Canadian Association of Radiologists, Toronto, March, 1967; with Drs. B. L. Bird and N. L. Patt, "The Spectrum of Pheochromocytoma," Canadian Association of Radiologists, Toronto, March, 1967.

H. E. Meema, "Method of Radiological Skin Thickness Measurement and Its Clinical Application" and "Diagnostic Problems in Osteoporosis," the Post-Graduate Medical School, London, England, April, 1967; with Dr. S. Meema, "The Relationship of Diabetes Mellitus and Body Weight to Osteoporosis in Elderly Females," Royal College of Physicians and Surgeons of Canada, Montreal, January, 1967.

C. A. F. Moes, "The Angiocardiographic Findings in Complete Transposition of the Great Vessels with Left Ventricular Outflow Tract Obstruction," Radiological Society of North America, Chicago, November, 1966; "Anomolous Pulmonary Venous Drainage from the Left Lung into a Left Vertical Vein," Canadian Association of Radiologists, Toronto, March, 1967.

M. V. Peters, "Achievements in the Management of Lymphoma," Scientific Programme, Georgetown University Hospital, Washington; "The Effect of Pregnancy in Carcinoma of the Breast," First Tenovus Cancer Symposium, Cardiff, Wales; "Radiotherapy in Advanced Hodgkin's Disease," International Symposium on Hodgkin's Disease, Rio de Janeiro; "The Value of the Localization of Occult Disease in the Treatment of Hodgkin's Disease," Proceedings of International Symposium on Lymphology, Universitat Kantonspital, Zurich, Switzerland.

W. D. Rider, "Immunotherapy for Trophoblastic Disease," Ninth International Cancer Congress, Tokyo, Japan.

D. E. Sanders, "Pulmonary Thrombo-Embolism," Ontario Thoracic Society, October, 1966 (panel); Toronto Academy of Medicine, December, 1966.

W. J. K. Simpson, "Early Diagnosis of Oral Cancer," Clinical Morning sponsored by the Canadian Cancer Society, The Princess Margaret Hospital, Toronto; "Fractionation Study in the Radiation of Glioblastoma Multiforme," Combined Meeting, Sections of Pathology and Neurological Sciences, Academy of Medicine; "Palliative Treatment of Elderly Patients with Malignant Disease," Geriatric Symposium, Providence Hospital, Toronto.

Research

Dr. R. F. Colapinto is pursuing his studies by celiac angiography, the selection of liver neoplasms, and, in conjunction with Dr. F. G. Pearson, Department of Surgery, has concluded his research on bronchial arteriography in dogs following lung transplantation.

Dr. J. W. Davidson, with Dr. E. A. Clark, Department of Radiology, and Drs. H. Patriquin and T. C. Brown, Department of Pathology, is carrying out the following research on lymphography in lymphomas, supported by the Ontario Cancer Treatment and Research Foundation: (*a*) clinical qualitative and quantitative estimation of lymph nodes by trace paper method in lymphomas and metastases, with direct and indirect pathological correlation; (*b*) the use of intralymphatic isotopes for both diagnostic kinetic studies and therapy; (*c*) the pharmacology of the lymph system; (*d*) influence of radiotherapy on the histiocytic response of the lung to Ethiodol.

Dr. J. W. Davidson, in association with Dr. E. Mullens, Department of Surgery, is also studying the evaluation of the fiber-optic gastroscope and gastrocamera in diagnosis of "early lesions" involving the stomach (with the support of the Ontario Cancer Treatment and Research Foundation) and the motility studies on possible disorders following irradiation causing dysphagia and dyspepsia.

Dr. E. L. Lansdown, in conjunction with Drs. W. G. Bigelow and A. S. Trimble, Department of Surgery, and Dr. H. E. Aldridge, Department of Medicine, is doing research on the assessment of aortic homographs, as well as on the assessment of left ventricular function with Dr. H. E. Aldridge, Department of Medicine, and Dr. E. H. Spratt, Department of Surgery. He is also studying the pre- and post-operative assessment of hiatus hernia in association with Drs. C. H. Shaul and R. M. Parrish, Department of Radiology.

Dr. H. E. Meema, with Dr. M. L. Bunker of the Department of Obstetrics and Gynaecology, and Dr. S. Meema, is expanding his research on mineral content of bone in the normal, the aged, and the pathological bone, supported by the Toronto Western Hospital research grant.

Dr. C. A. F. Moes, in conjunction with the Cardiology Department, Hospital for Sick Children, is carrying out the following projects: (*a*) continuing the investigation of infundibulum as demonstrated angiocardiographically in pulmonary stenosis with normal aortic root, in tetralogy of Fallot, and in ventricular septal defect with right ventricular outflow tract obstruction; (*b*) a study on the angiocardiographic findings in a double outlet right ventricle, (*c*) a study on the angiocardiographic findings in a single ventricle.

Dr. J. D. Munn is studying hydrogen peroxide enemas in dogs and the volvulus in the newborn associated with erythroblastosis.

Dr. D. E. Sanders is a team member on continuing research projects in (1) long-term effects of smoking in women and (2) investigation and treatment of pulmonary emphysema conducted by Dr. C. R. Woolf, Department of Medicine. He is also carrying out a study of the applications of transthoracic aspiration needle biopsy in localized intrathoracic lesions with Drs. N. C. Delarue and F. G. Pearson, Department of Surgery, and Dr. D. W. Thompson, Pathology Department.

The following research projects, supported by the Ontario Cancer Treatment and Research Foundation, are conducted by members of the Department of Radiotherapy:

1. Dr. C. L. Ash, in conjunction with Drs. W. R. Bruce and G. F. Whitmore, Division of Physics: effect of multiple daily dose fractionation on skin tolerance.
2. Dr. R. G. Baker, Department of Medicine, with Dr. H. J. Dworkin: development and clinical trials of improved scanning techniques.
3. Dr. R. S. Bush, with Dr. W. R. Rider: to study in detail the construction and use of oxygen micro-electrodes.
4. Dr. J. R. Cunningham, Division of Physics, with Dr. W. D. Rider: an exploration and development of the uses of computer in radiotherapy.
5. Dr. N. V. Hawkins, in association with Dr. W. R. Bruce, Department of Medical Biophysics: effect of fractionation regimes on the survival of tumour and normal cells in mice.
6. Dr. J. W. Meakin, Department of Medicine, with Drs. T. C. Brown, Pathology Department, W. E. C. Allt, F. A. Beale, P. J. Fitzpatrick, N. V. Hawkins, and R. D. T. Jenkin: ovarian irradiation and prednisone following surgery for carcinoma of the breast.
7. Dr. M. V. Peters, in conjunction with Dr. T. C. Brown, Pathology Department, and Dr. R. E. Alison, Department of Medicine: the value of local or regional radiation in early Hodgkin's disease.
8. Dr. W. D. Rider, with Dr. B. Cinader, Division of Biological Research: immunotherapy in the management of trophoblastic tumours.
9. Dr. W. D. Rider: pre-operative radiation in operable cancer of the rectum.
10. Dr. W. D. Rider: a study of acute radiation syndrome.
11. Dr. W. J. K. Simpson: fractionation study in the radiation of patients suffering from glioblastoma multiforme.

Publications

Davidson, J. W. *et al.* "Radiographic Appearances in Chromolymphadenography" (*Journal of the Canadian Association of Radiologists*, vol. 18, no. 2, June, 1967, pp. 316–21).

Davidson, J. W., Peters, M. V. *et al.* "Lymphography in Lymphoma" (*Radiology*, vol. 88, no. 2, Feb., 1967, pp. 281–6).

Fitzpatrick, P. J. "Nasopharyngeal Angiofibroma" (*Clinical Radiology*, vol. 18, no. 1, Jan., 1967, pp. 62–8).

——— "Tumours of the Skin" (*Canadian Nurse*, vol. 63, no. 2, Feb., 1967, pp. 45–7; *L'infirmière canadienne*, 9e année, numéro 2, fév., 1967, pp. 33–5).

Humphry, A. and Munn, J. D. "Abnormalities of the Urinary Tract in association with Congenital Cardiovascular Disease" (*Canadian Medical Association Journal*, vol. 95, no. 4, July 23, 1966, pp. 143–5).

Jenkin, R. D. T. "Ewing's Sarcoma: A Study of Treatment Methods" (*Clinical Radiology*, vol. 17, no. 2, April, 1966, pp. 97–106).

Jenkin, R. D. T., Peters, M. V. and Darte, J. M. M. "Hodgkin's Disease in Children" (*American Journal of Roentgenology*, vol. 100, no. 1, May, 1967, pp. 222–6).

Lansdown, E. L. *et al.* "Evaluation of the Urea Washout Pyelogram and Urography in the Assessment of Renovascular Hypertension" (*Canadian Medical Association Journal*, vol. 96, no. 5, Feb. 4, 1967, pp. 245–56).

Meema, H. E. "Fluorides and Osteoporosis" (*The Lancet*, vol. 1, Feb. 25, 1967, p. 444).

——— "Menopausal and Aging Changes in Muscle Mass and Bone Mineral Content: A Roentgenographic Study" (*Journal of Bone and Joint Surgery*, vol. 48-A, no. 9, Sept., 1966, pp. 1138–44).

Meema, H. E. *et al.* "The Relationship of Diabetes Mellitus and Body Weight to Osteoporosis in Elderly Females" (*Canadian Medical Association Journal*, vol. 96, no. 3, Jan. 21, 1967, pp. 132–9).

Moes, C. A. F. *et al.* The Angiocardiographic Findings in Complete Transposition of the Great Vessels with Left Ventricular Outflow Tract Obstruction" (*Radiology*, vol. 88, no. 6, June, 1967, pp. 1092–9).

——— "The Significance of the Atrial Situs in the Diagnosis of Positional Anomalies of the Heart. Part II. An Angiocardiographic Study of 29 Patients" (*American Heart Journal*, vol. 73, no. 1, Jan., 1967, pp. 41–8).

Moes, C. A. F., Fowler, R. S. and Trusler, G. A. "Total Anomalous Pulmonary Venous

Drainage into the Azygos Vein" (*American Journal of Roentgenology*, vol. 98, no. 2, Oct., 1966, pp. 378–87).
Moes, C. A. F. and Keith, J. D. "Angiocardiography"; in *Heart Disease in Infancy and Childhood*, by J. D. Keith, Chapter 7, pp. 112–35. New York: Macmillan. 1967.
Moes, C. A. F., Mustard, W. T. *et al.* "Complete Transposition of the Great Vessels with Anatomic Obstruction of the Outflow Tract of the Left Ventricle: Surgical Implications of Anatomic Findings" (*American Journal of Cardiology*, vol. 19, no. 5, May, 1967, pp. 658–70).
Peters, M. V. "Prophylactic Treatment of Adjacent Areas in Hodgkin's Disease" (*Cancer Research*, vol. 27, no. 6, part 1, June, 1966, pp. 1232–43).
Reilly, B. J. "Infantile Pyelonephritis: A Preliminary Report" (*Annales de Radiologie*, April, 1967, vol. 10, pp. 268–72).
Reilly, B. J. *et al.* "Visualization of the Inferior Vena Cava in Routine Intravenous Pyelography" (*Journal of the Canadian Association of Radiologists*, vol. 17, no. 4, Dec., 1966, pp. 200–5).
Rider, W. D. and Cinader, B. "Immunotherapy for Trophoblastic Disease" (*IX International Cancer Congress*, Tokyo, 1966, p. 599).
Sanders, D. E. "Angiography in Pulmonary Thrombo-Embolism" (*Bulletin of the Academy of Medicine, Toronto*, vol. 40, no. 6, March, 1967, pp. 81–3).
Wortzman, G. "Posterior Fossa Myelography using Positive Contrast Medium" (*Journal of the Canadian Association of Radiologists*, vol. 17, no. 4, Dec., 1966, pp. 188–97).

SURGERY

Under the direction of Professor W. R. Drucker

The rapid accumulation of scientific information, coupled with the fundamental alterations in the socioeconomic structure of our society, has necessitated a thorough reappraisal of undergraduate medical education. In concert with all clinical departments that stress the importance of comprehension of mechanisms of illness, diagnosis, and therapy, the Department of Surgery is very much involved with changes in the curriculum.

This Department is committed to the concept that authority for the development and implementation of educational policy must be delegated to members of the Faculty on a University-wide basis. Several members of the Department are assisting with detailed interdepartmental planning in subject and systems committees. Dr. Neil A. Watters, Surgeon-in-Chief of the Wellesley Hospital, has accepted the unprecedented task of co-ordinating the activities of the teaching committees planning the third period of the new curriculum. Other committees with departmental representation are: Committee for Principles and Methods of Diagnosis—Dr. O. V. Gray, Toronto Western Hospital (Vice-Chairman), Dr. J. S. Simpson, The Hospital for Sick Children, Dr. D. J. Currie, St. Michael's Hospital; Nervous System Committee—Dr. W. J. Horsey, St. Michael's Hospital (Vice-Chairman); Cardiovascular Systems Committee—Dr. D. R. Wilson, Toronto Western Hospital (Vice-Chairman); Respiratory System Committee—Dr. N. C. Delarue, Toronto General Hospital; Gastrointestinal System Committee—Dr. N. T. McPhedran, Toronto General Hospital (Chairman), Dr. J. E. Mullens, Wellesley Hospital; Genitourinary System Committee—Dr. W. K. Kerr, Toronto General Hospital (Vice-Chairman), Dr. V. Colapinto, St. Michael's Hospital; Musculoskeletal Systems Committee—Dr. R. B. Salter, The Hospital for Sick Children (Chairman), Dr. W. R. Harris, Toronto General Hospital (Vice-Chairman), Dr. W. N. Lotto, Toronto Western Hospital. Each of the eight hospitals in the undergraduate surgical programme will be assisted to develop their facilities and expand their faculties enough to implement the new educational programmes.

In order to avoid a hiatus of indifference between the present and the time of inception of the revised curriculum, several members of the Department are modifying the present curriculum to mitigate at least the areas of gross dissatisfaction. Reorganization of the teaching of surgery in the second, third, and fourth years of the current curriculum will be the responsibility respectively of Drs. Bernard

Langer, J. E. Mullens, and J. A. Palmer. Dr. Langer also will co-operate with other members of the University to establish methods of examination and evaluation which are conducive to a mature educational environment. It is anticipated that numerical class standing will shortly become an unlamented vestige of the past.

As the University embarks upon its bold new programme for undergraduate medical education, it has become apparent that the very factors which necessitated this change are equally cogent reasons for revision of the residency and postgraduate programmes. Such issues as relation between the internship and the clerkship in the final medical school year, the lack of interdepartmental interdisciplinary teaching in the residency programmes, the role of investigative work in medical education, the education of clinical scientists, and the virtual disappearance of the public or indigent patient are critical issues that must be faced without delay. These complex problems must be considered in relation to the plans for revision of undergraduate education. By their very nature they require that the University accept responsibility for residency education. The able administrative assistance and sound counsel of Dr. Robert A. Mustard as Director of the Graduate Programme in Surgery augurs well for the solution of these problems.

If the challenges of the times are to be converted into opportunities for constructive new endeavours, it is clear that the many talents of the Faculty must be mobilized. To this end, administrative structures previously established within the Department have been utilized and amplified. The executive committee composed of the surgeons-in-chief of each of the University hospitals has met with increasing frequency to discuss the new curriculum and plan for the growth and development of each of the hospitals. It is unlikely that proposals for the new curriculum or plans for institutional development would have reached fruition without the harmonious co-operative spirit of all members of this committee. The comprehensive, concise minutes of the secretary facilitated an orderly consideration of issues. Membership of the committee includes: Drs. R. B. Salter, The Hospital for Sick Children; D. R. Bohnen, New Mount Sinai Hospital; A. W. Farmer and A. W. Harrison, Sunnybrook Hospital; J. R. F. Mills, Toronto General Hospital; D. R. Wilson, Toronto Western Hospital; W. J. Horsey, St. Michael's Hospital; M. I. Davis, Women's College Hospital; N. T. McPhedran (Secretary) and F. G. Kergin (ex officio).

An Inter-Hospital Co-ordinating Committee has been established for the specialty of general surgery, under the able direction of Dr. E. Bruce Tovee. This committee, in conjunction with previously established committees for cardiovascular surgery (Dr. W. G. Bigelow), neurosurgery (Dr. T. P. Morley), orthopaedic surgery (Dr. F. P. Dewar), plastic surgery (Dr. W. K. Lindsay), and urological surgery (Dr. C. J. Robson), functions to advise the Head of the Department and the Surgeons-in-Chief Committee in regard to: undergraduate teaching of the specialty; selection of candidates for residency education; rotation of residents in the programme; selection of research fellows; modification of the residency programme, and any other matters designated by the Department. Essential tasks of these committees will be to co-operate with the Director of Graduate Training to permit integration of the residency programmes of the specialties in hospitals, and to assist with the developing undergraduate programmes. A committee for thoracic surgery is being formed under the direction of Dr. F. G. Pearson.

Fortunately, planning for increased participation of the faculty in educational programmes can be undertaken with assurance that at least a few individuals will receive more than the traditional token financial support. It is axiomatic that success in achieving our goals in both undergraduate and graduate education is dependent upon provision of financial security for members of the Faculty. Increased funds for Faculty support, together with delegation of responsibility for educational programmes, should provide an environment conducive to the development of the increased numbers of strong, imaginative, and progressive leaders required by the Department.

Departmental participation in the activities of the Division of Postgraduate Medical Education have continued. Dr. J. R. F. Mills again organized the "Surgery for Specialists" Course in February; the Course in Paediatric Surgery was organized by the staff of The Hospital for Sick Children; and Dr. F. P. Dewar and associates again conducted a Course in "Fractures and Associated Trauma." Partial support for this latter endeavour was provided through the generous offices of the Workmen's Compensation Board.

Several special events have occurred during the past year. In February the Department was honoured to be host to the first combined meeting of the Society of University Surgeons and the British Surgical Research Society. This meeting brought to the University outstanding clinical scientists and educators in the field of surgery from all corners of the world. Certain innovations such as pre-meeting operative clinics, tours through hospital and laboratory facilities conducted by members of the resident staff, and exhibits of significant contributions from this University to medical knowledge were featured. All who attended the meeting were presented with a collection of abstracts of investigative work in progress in the Department, dedicated to the memory of Dr. Robert M. Janes. According to many of the congratulatory letters received, the highlight of the banquet was the address by J. M. S. Careless, Professor of History, who discussed the naval engagements in the War of 1812. The success of the meeting reflected the imaginative and dedicated work of Dr. R. O. Heimbecker and his local committee. Financial support for this meeting was provided by generous donations from: the Ontario Heart Foundation; J. P. Bickell Foundation; Ontario Division, Canadian Cancer Society; Department of Health of Ontario, and others.

A second major medical meeting to which the Department was host was the American Association of Plastic Surgeons. The enthusiastic response of the membership, which includes the leaders of plastic surgery in North America, is a credit to the smooth conduct of affairs by Dr. W. K. Lindsay and his local committee.

An increasingly important feature of the programme for graduate education in the Department is the participation of visitors in activities of the Department. For two weeks during the fall, the Department was stimulated by the McLaughlin-Gallie visiting professor, A. L. d'Abreu, the Professor of Surgery at Birmingham, England, and the former Dean of that school. His energy, wisdom, and fearless appraisal of medical education greatly assisted the evolution of the educational programme in our institution. It is anticipated that his influence will continue through Dr. R. D. Henderson, the present Chief Resident at the Toronto General Hospital, who will work with Mr. d'Abreu next year.

The Balfour Lecture was delivered by Philip Allison, the Nuffield Professor of Surgery at Oxford. He discussed pulmonary embolism, and clearly demonstrated with films his concept of the pathogenesis of this entity.

Other important visiting professors during the year were: Mr. Leslie P. Le Quesne, Professor of Surgery at the Middlesex Hospital in London, England, who discussed both his extensive experience with oesophageal surgery and his investigations of the pathophysiology of metabolic alkalosis following pyloric obstruction; Mr. A. M. P. Forrest, Professor of Surgery at Cardiff, Wales, who discussed his clinical and experimental investigations of breast cancer, and provided ample stimulus for a reappraisal of our concepts of surgery for this disease; Mr. Robert Shields, Senior Lecturer in Surgery at Cardiff, Wales, who contributed an exciting insight into the mechanisms of fluid imbalance that occur with disorders of the intestinal tract; Dr. Rene Menguy, Professor of Surgery at the University of Chicago, who lectured on the pathophysiology of peptic ulceration, emphasizing his research, which has contributed much to our current concepts of this problem; Dr. Benjamin Rush, Professor of Surgery at Lexington, Kentucky, who drew on his experience with a population previously denied adequate medical attention to discuss many problems of neglected cancer; Dr. George Crile, Jr., Chief of General Surgery at the Cleveland Clinic, who presented and defended his controversial views regarding

surgery for cancer of the breast; Dr. Melvin Glimscher, Professor of Orthopaedic Surgery at Harvard University, who spent a week conducting stimulating teaching rounds at all of the University hospitals and lecturing on his biophysical studies of bone physiology; Dr. Leslie Duncan, a member of the Department of Medicine at the University of Edinburgh, Scotland, who discussed the management of diabetic patients subjected to surgery; and Dr. Leroy McDaniel from Covina, California, a representative community surgeon, who spent several days working with members of the resident staff. Each of these men, through informal discussions with residents and faculty, contributed more than their stated subjects. Their views, frequently at variance with those of others, serve to maintain the spirit of enquiry essential to university function. Many of these visits would not have been possible without support from the Division of Postgraduate Education, under Dr. Ian Macdonald. Others were supported generously by donations from private funds.

The Department has also been pleased to welcome during the past year visits from Mr. K. S. Till of Oxford; Mr. C. M. G. Duran of Radcliffe Infirmary, Oxford; Dr. Stanley Jacobs, University of Oregon; Dr. Robert Macbeth, University of Alberta; and Dr. John Gutelius, McGill University.

The Department and the medical community were saddened this year by the death of Dr. Robert M. Janes, former Professor and Head of the Department. His fundamental contributions to thoracic surgery and his abiding interest in the graduate programme in surgery gained for him universal respect and admiration.

Several new appointments have been made: Dr. Robert A. Mustard—Professor and Associate Director of the Department; Dr. A. W. Farmer—Acting Surgeon-in-Chief, Sunnybrook Hospital; Dr. J. R. F. Mills—Deputy Surgeon-in-Chief, Toronto General Hospital; Dr. Kenneth Livingston, a graduate of Harvard Medical School—Associate Professor and Director of Neurosurgery at the Wellesley Hospital; Dr. E. P. McDougall—Associate and Director of Plastic Surgery at St. Michael's Hospital; Dr. J. Hart, a graduate of Northwestern Medical School—clinical teacher in Cardiovascular Surgery, St. Michael's Hospital; Dr. John Burrington, a graduate of Harvard Medical School—clinical teacher in General and Thoracic Surgery, The Hospital for Sick Children and the Toronto General Hospital; Dr. Andrew Halmagyi, a graduate of Queen's University—clinical teacher in General Surgery, St. Michael's Hospital.

At the conclusion of this introduction I would like to thank the members of the Department for their unselfish co-operation in affairs during my first year. Wise counsel and sound judgment were always available to assist me in assuming my new responsibilities from the former Head of the Department, Dr. F. G. Kergin.

Scholarly Addresses

Members of the Department have presented scholarly addresses and participated in symposia in numerous local, regional and national meetings. At best, only a cursory list of these activities is possible.

Prof. W. G. Bigelow, Ontario Heart Foundation; Royal College of Surgeons of Canada.

Dr. V. Colapinto, Ontario Medical Association; Canadian Urological Association.

Prof. W. R. Drucker, Halsted Society, Baltimore; Postgraduate Course, American College of Surgeons, San Francisco; St. Joseph's Hospital, Hamilton; Canadian Association of Clinical Surgeons, Eastern Division; Postgraduate Course on Trauma, American Academy of Orthopaedic Surgeons, Cleveland; Canadian Defence Research Board; Sectional Meeting, American College of Surgeons, San Diego; St. Barnabas Medical Center, Livingstone, New Jersey; Society of University Surgeons and British Surgical Research Society; Montreal Medical Chirurgical Society; Canadian Association of Radiologists; Lincoln County Academy of Medicine, St. Catharines; Queen's University, Kingston; Postgraduate Course in Surgery,

University of Kansas; Johns Hopkins Hospital, Baltimore; University of Maryland; University of Alberta; Western Reserve University; American Association of Plastic Surgeons; Canadian Association of Gastroenterology, State University of New York (Upstate), Syracuse.

Dr. J. E. Hall, British Orthopaedic Association, Southampton, England; Copenhagen Orthopaedic Group, Denmark; Washington Orthopaedic Group, Washington, D.C.

Dr. W. R. Harris, University of the West Indies.

Prof. R. O. Heimbecker, Society for Vascular Surgery; Royal College of Surgeons of Canada; Canadian Association of Clinical Surgeons; Academy of Medicine; Society of University Surgeons; Central Surgical Society.

Prof. E. B. Hendrick, Royal College of Surgeons of Canada.

Dr. R. W. Jackson, Panel, Orthopaedic Research and Education Seminar, Washington, D.C.

Prof. R. D. Jeffs, Western Division of the Royal College of Physicians and Surgeons of Canada; Janes Surgical Society; Canadian Urological Association.

Dr. P. G. Klotz, Medical Alumni Association.

Dr. G. H. Knutson, The Inter-urban Surgical Society.

Dr. B. Langer, Canadian Association of Clinical Surgeons, Eastern Division.

Prof. W. K. Lindsay, American College of Surgeons.

Prof. I. Macnab, Symposium on Trauma, Massachusetts General Hospital, Boston; Canadian Orthopaedic Association; Canadian Association of Anaesthetists; Canadian Arthritis and Rheumatic Association; Canadian Association of Physical Medicine and Rehabilitation; American Academy of Orthopaedic Surgeons, Symposium on Trauma, Dallas; University of Minnesota, Minneapolis; American Academy of Orthopaedic Surgeons, Postgraduate Course on Trauma, Cleveland; Hamilton and District Rheumatic Diseases Unit; American Academy of Orthopaedic Surgeons; Boston Orthopaedic Club; University of Virginia, Charlottesville; Virginia Orthopaedic Association; Scott County, Iowa and Rock Island County, Illinois Medical Societies; State University of New York, Buffalo.

Dr. R. E. Mathews, Academy of Medicine, Division of Surgery.

Dr. N. T. McPhedran, Symposium on Athletic Injuries, Vancouver; Central Surgical Association.

Dr. J. Moffat, Royal College of Surgeons of Canada; Kellogg Foundation Meeting, Welland.

Prof. T. P. Morley, Wesley Memorial Hospital, Northwestern University, Chicago.

Prof. W. T. Mustard, Buffalo School of Medicine and the Buffalo General Hospital; Society of University Surgeons and British Surgical Research Society; Dr. Adrian Ehler Memorial Lecture, Albany, N.Y.; American College of Cardiology, Minnesota Heart Association and American Therapeutic Society; American Heart Association; San Francisco Heart Association; Tidewater Heart Association, Norfolk, Virginia.

Dr. F. G. Pearson, 9th International Congress on Diseases of the Chest, American College of Chest Physicians, Copenhagen, Denmark; Regional Meeting of the Royal College of Physicians and Surgeons of Canada, Laurentian University, Sudbury; Royal College of Physicians and Surgeons, Ottawa; Society of University Surgeons and British Surgical Research Society; American Association for Thoracic Surgery; Ontario Medical Association; Western New York Chest Conference, Lockport, N.Y.

Dr. R. L. Ruderman, Dewar Orthopaedic Club.

Prof. J. L. Russell, Canadian Neurosurgical Association; Canadian Academy of Neurological Surgeons.

Prof. R. B. Salter, International Orthopaedic Society, Barcelona, Spain; Carolina Orthopaedic Society, Raleigh, N.C.; Sir Robert Jones Lecture, New York; University of Buffalo; Northwestern University, Chicago; University of the West

Indies, Kingston, Jamaica; Dartmouth University, Hanover, New Hampshire; Southern Medical Association, Dallas, Texas; University of Miami, Miami, Florida; University of Texas (Medical Branch), Galveston.

Dr. E. H. Simmons, Canadian Orthopaedic Association; American College of Surgeons, San Francisco; American Academy of Orthopaedic Surgeons, San Francisco; Dewar Orthopaedic Club; Janes Surgical Society.

Dr. R. Tasker, Canadian Congress of Neurological Sciences; American Academy of Neurological Surgery; Royal College of Physicians and Surgeons of Canada; Society of University Surgeons; International Society for Research in Stereoencephalotomy, Madrid; Canadian Medical Association; 2nd International Congress of Neurogenetics and Neuroophthalmology, Montreal.

Dr. H. G. Thomson, American Association of Plastic Surgeons; Canadian Society of Plastic Surgeons.

Dr. A. S. Trimble, Royal College of Physicians and Surgeons of Canada; American Association for Thoracic Surgery.

Dr. W. Zingg, Symposium on Rheomacrodex, Toronto; Canadian Association of Clinical Surgeons, Eastern Division; Panel on Trauma and Shock, Defence Research Board of Canada; Royal College of Physicians and Surgeons of Canada.

Research

Generous support for research has been provided by the Medical Research Council, Health Resources Fund, other government agencies, and private donations. No serious commitment to investigative work could be possible without this support. But it is clear that if the objectives of the expanded educational programme are to be realized, significant increments of space, equipment, personnel, and financial support must become available. For this expansion, co-ordinated planning between the many hospitals and medical centres is essential to avoid wasteful duplication of resources. Despite the increasing distractions of administrative chores and commitments to educational programmes, members of the Faculty have continued productive research. The following catalogue of their activities is a clear indication of interest in and capacity for investigative work.

Cardiovascular Surgery

Under the capable and imaginative direction of Dr. W. G. Bigelow, the problem of homograft valve preparation, storage, and transplantation have been the major areas of investigative activity. Dr. R. O. Heimbecker: studies of myocardial infactectomy with particular attention to the biochemical alterations; physiological changes with sudden decompression in the hyperberic chamber; clinical research on pulmonary embolectomy; fate of homograft and heterograft valves. Dr. J. Key: long-term follow-up studies of patients from whom abdominal aortic aneurysms have been resected. Dr. W. T. Mustard: continuing studies on membrane oxygenators for infancy—to date a suitable membrane has been found which meets the rigid requirements for use in infancy, but a suitable oxygenator has yet to be discovered; studies on the use of a pedicle graft from the diaphragm to replace the ventricular wall. Dr. A. S. Trimble: storage and sterilization of homograft valve; transplantation of homograft valves and organs; continuing studies on hibernation. Dr. G. Trusler: studies on homograft and prosthetic valves.

General and Thoracic Surgery

Dr. D. Bohnen: continuing study of the pathogenesis and repair of large hernial defects. Dr. S. Chris: clinical studies of endometriomata in superficial scars; studies of familial polyposis of the colon. Dr. D. Currie: pathogenesis of cholecystitis and cholelithiasis. Dr. A. Davies: retrospective study of blunt abdominal trauma; role of antibiotics in wound healing. Dr. N. Delarue: pulmonary angiography in lung carcinoma; role of sputum cytology in screening for lung pathology. Dr. W. R.

Drucker: alterations in energy metabolism with hypovolemic shock; effect of injury on nutrition; pathophysiology of gastrointestinal fluid disorders. Dr. G. Hiraki: post-operative wound infections. Dr. W. H. Kerr: studies of wound irrigations. Dr. I. Koven: effect of surgery and anaesthesia on body fluid compartments. Dr. B. Langer: homotransplantation of the canine liver. Dr. J. MacDonald: chemotherapy of tumours metestatic to the liver. Dr. N. T. McPhedran: studies of gastric secretagogue in obstructed portal vein. Dr. J. Moffat: decamping phenomena with particular reference to the bradykinin system. Dr. J. E. Mullens; pathogenesis of ulcerative colitis. Dr. R. Mustard: studies of cervical and esophageal carcinoma. Dr. J. Palmer, in co-operation with Dr. E. Yendt: studies on the pathophysiology of hyperparathyroidism. Dr. G. Pearson: methods for improvement of early post-operative respiratory functions; experimental and clinical studies of the production of trachial stenosis following use of cuft endotracheal tubes; effect of radiation on prostheses used for replacement of the trachea; bronchial arterial regeneration following lung transplantation; mediastinoscopy. Dr. H. F. Robertson: role of hydrogen peroxide as a source of oxygen for tissues. Dr. R. Ruderman: mechanisms for dissolution of biliary calculi. Dr. B. Shandling: pressure studies in patients with Hirschsprung's disease; experimental study of testicular necrosis following torsion of the testes; follow-up studies on hiatus hernia in children. Dr. S. Sidlofsky: portal vein catheterization. Dr. E. B. Tovee: pathophysiology of motorcycle injuries. Dr. R. Wilkinson: studies of nylon catheters for intravenous infusions. Dr. W. Zingg: shortgut syndrome and gastric hypersecretion; rheology of blood; rewarming shock; in collaboration with Dr. W. T. Mustard, studies on neonatal cardiac surgery.

Neurosurgery

Dr. Fleming: clinical studies in the control of trigeminal neuralgia; studies of cerebral spinal fluid dynamics in communicating hydrocephalus; a review of results of carotid endoterectomy. Dr. E. B. Hendrick: a review of the long-term effects of hemispherectomy in children; 15-year survey of cerebral and cerebellar neoplasms in children. Dr. H. J. Hoffman: effect of steroids on experimental cerebral edema. Dr. W. Horsey: studies of techniques on brain scanning; in co-operation with Dr. Schatz, studies of the results of anterior discotomy and fusion for cervical brachial pain. Dr. W. Lougheed: studies of experimentally induced cerebral arterial spasm and the effect of spasm on control of intra-cerebral hemorrhage; the effect of pharmocological agents on arterial spasm. Dr. T. P. Morley: up-take of radioactive isotopes by intercranial neoplasms and other lesions *in vivo* and *in vitro*. Dr. S. Shatz: effect of alternating current stimuli in coma due to space-occupying lesions in the skull. Dr. R. Tasker: studies of normal brain structures and tumour detection with an impedance probe; humunculus relationship of the human sensory thalamus; effect of stereotactic surgery on Parkinson's disease and pain; studies of the electrophysiology of the tremor mechanism of drug-induced tremor.

Orthopaedic Surgery

Dr. W. Bobechko: auto immune reactions of articular cartilage; clinical investigation of osteoid osteoma. Dr. D. Gibson: biomechanical studies of efficiency of muscle function. Dr. D. Hastings: neoplasms of the atlas and axis. Dr. W. Harris: study of prostheses that stimulate limb growth; metabolic studies of epiphysial plate cartilage. Dr. R. Jackson: effect of hyperbaric oxygenation on fracture healing; tissue culture of bone and bone tumours. Dr. I. Macnab: effects of systemic cortico steroids on bone metabolism; effect of intra-articular administration of cortico steroids. Dr. G. McDonald: biochemical and histological studies of lumbar discs; development of technique to measure disc pressure. Dr. G. Pennal; factors involved in non-union of pelvic fractures; studies of point of motion of lumbar spine. Dr. R. Salter: avascular necrosis of the femoral head in young adults; effects of cortisone on living articular cartilage in rabbits; alteration in contour of articular surfaces following prolonged immobilization of the joint during the growing period. Dr. E. Simmons: biomechanical study of cervical spine; late assessment of the effects

of Caisson disease in compressed-air workers. Dr. A. Wiley: natural history of rheumatoid disease of the hand; prosthetic hip replacement; remote effects of injury upon fracture and callus formation.

Plastic Surgery

Dr. W. K. Lindsay: metabolic studies of wound healing of digital flexor tendon tissue; clinical and bacteriological studies of reverse isolation in therapy for burned patients. Dr. H. Thomson: studies of surgical tattooing; wringer injuries; flexor tendon glide studies in primates.

Urology

Dr. G. T. Cook: effect of splenic emulsion on longevity of renal homographs. Dr. V. Colapinto: isolated profusion of canine kidneys; effect of transurethral resection on blood volume and red blood cell mass. Dr. P. Crassweller: pathogenesis of renal lithiasis in relation to excretion of hydrogen ions; effect of nitrogen mustard therapy on transitional cell tumours of the bladder. Dr. G. Farrow: methods for preservation of small organs; studies of renal blood flow; angiotension studies of renal vein following transplantation. Dr. R. Jeffs: experimental non-obstructive pyelonephritis; renal transplantation. Dr. Keresteci: pre- and post-radiation assessment of bladder tumours by fluorescence cystoscopy. Dr. W. Kerr: studies of bladder tumours and hypernephroma. Dr. P. G. Klotz: studies of pyelonephritis in relation to the effect of hyperbaric oxygen and reflux of urine. Dr. G. N. Ranking: adrenal transplantation; ureteral replacement. Dr. C. Robson: artificial stimulation of the neurogenic bladder. Dr. T. Russell: studies of postprostatic urinary incontinence; prophylaxis of urinary infection following transurethral resection; treatment of acute and chronic urinary tract infection.

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Aldridge, H. E., Goldman, B. S. and Bigelow, W. G. "The Course of Patients following Replacement of the Mitral Valve by a Starr-Edwards Prosthesis" (*Diseases of the Chest*, vol. 50, 1966, p. 186).

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THE DIRECTOR OF THE BANTING AND BEST DEPARTMENT OF MEDICAL RESEARCH

In the Subdepartment of Synthetic Chemistry the synthesis of phospholipids and phosphonolipids of biological interest was continued by Professor E. Baer and his colleagues, Dr. D. Buchnea (propylene glycol lecithins and cephalins, acyl migration in lipids), Dr. H. Basu (phosphonic acid analogues of N,N-dimethylcephalins and glycolcephalins), Dr. B. C. Pal (ceramide and dihydroceramide aminoethylphosphonates), Dr. R. Robinson (phosphonolecithins and metabolites), Dr. G. R. Sarma (phosphonocephalins and metabolites) and Dr. K. V. J. Rao (phosphonic acid analogues of diether N,N-dimethylcephalins). The members of the staff were ably assisted in their work by Mr. H. Flehmig.

In Dr. D. W. Clarke's section, work has continued on a study of the properties of serum from persons suffering from multiple sclerosis. Under appropriate conditions,

such serum can cause an increase in fatty acid concentration in a medium in which a slice of rat cerebral cortex is incubated. The nature of this factor is being investigated, and studies are being made to see if there is a relationship between the amount of free fatty acid which can be liberated by the serum, and the severity of the disease.

Mr. Cowan devised a simple and ingenious piece of apparatus which proved excellent for the procedure involved in a study, with Professor Monkhouse, of artificial induction of thrombosis. They hope now to apply these methods in a study of the effect of dextran and other substances on the deposition and aggregation of platelets at the site of injury. This would allow observation from the moment of initiation of injury in preference to only postoperative histological studies. Mr. Cowan also devised a continuous intra-arterial injection instrument "Conjector" which, in collaboration with doctors at St. Michael's Hospital, was successfully tested clinically in regional infusion chemotherapy on ambulatory cancer patients. The mechanism will deliver 2 or 5 ml. throughout a twenty-four hour period.

With the assistance of Miss M. M. Shaw and J. Skublics, Professor W. R. Franks has continued the cancer research directed toward modifying a tumour-bearing host into a tumour-incompatible graft-hybrid. Current investigations have shown that it is very difficult to completely destroy a host's lymphoid mechanisms in order to hybridize with tumour-resistant elements. However, present experience would tend to confirm that the degree of sensitivity of an autochthonous tumour to an otherwise palliative dose of X-rays does seem to be proportional to the degree of destruction of the host's own pertinent "information" previous to hybridization. Reversal of the hybrid state following tumour cure may be accomplished with deep-freeze preserved host's tissues.

Studies of the biochemical post mortem in accident investigations have been extended from fundamental animal work to human tissues. The P.M. lactate concentration still yields the most information, serving to differentiate fatigue, adrenergic response and hypoxia by the character of the P.M. lactate profile made by plotting the brain, heart, liver and kidney lactate concentrations. It is apparent that a factor in the cause of some accidents may be a lack or a blocking of response to a stressful circumstance (stress without strain).

Mr. G. A. Meek's studies to improve manual dexterity in a vibrating field have led to further improvement in the design of manually operated installations.

In Professor A. A. Horner's laboratory, gel electrophoresis of acidic mucopolysaccharides continues to be the major interest. The method has shown that sulphate content and molecular weight may vary inversely in heparin fractions. Anticoagulant activity is directly proportional to molecular weight. Gel filtration is being used to establish criteria for evaluating the degree of polydispersity of molecular weight of acidic mucopolysaccharides which may alter in diseases of connective tissue.

Dr. A. Kuksis has continued studies on the composition and metabolism of complex natural lipids by thin-layer and gas chromatographic methods. Applications of the combined methods were made in determining alterations in triglyceride structure during milk fat secretion and fat absorption (in collaboration with W. C. Breckenridge), in the isolation and identification of bile acids from blood, bile and tissues (in collaboration with M. T. Subbiah) and in the identification and quantitative estimation of Krebs cycle acids in tissues. New methods have been developed for the direct gas chromatographic examination of total lipid extracts and for the determination of the complete structure of natural glycerophosphatides (in collaboration with L. Marai).

In Dr. Logothetopoulos' section the mitotic activity and the origin of beta and alpha cells of the islets have been studied by autoradiography. In collaboration with Dr. H. Kerr, NATO Fellow from the University of Heidelberg, electron microscopy studies of the islets of the obese mouse and of guineapigs with induced steroid diabetes have been completed.

Professor C. C. Lucas and Dr. Jessie H. Ridout continue their investigation of the nutritional relationships between alcohol and different dietary proteins. Purified

rations differing only in the protein moiety (all providing 6 per cent of total protein) were fed to groups of male rats for about 500 days; four times per week a constant amount of dilute alcohol (5.5 ml. 40 per cent v/v) was given by stomach tube. The nature of the dietary protein affects the degree of inebriation produced and the amount of liver damage observed. Mortality was usually higher in the groups of rats that were more intoxicated but this was not always so. The concentrations of alcohol found in the blood of rats fed different proteins were not sufficiently dissimilar to account for the findings.

In Professor S. Mookerjea's section, investigations on the influence of dietary choline on the plasma lipoprotein synthesis are being continued. Plasma lipoproteins of density < 1.006, 1.006–1.063 and 1.063–1.21 are rapidly labelled after intraperitoneal injection of glucosamine-1-C^{14}. In early choline deficiency, incorporation of labelled glucosamine into proteins of liver homogenates, microsomes and of plasma $d > 1.21$ fraction is impaired. The site of impairment is in the smooth endoplasmic reticulum portion of the microsome. These findings suggest that decreased glycoprotein synthesis in smooth microsome and in plasma $d > 1.21$ fraction may limit the plasma lipoprotein synthesis and thereby cause the accumulation of lipids in the liver in choline deficiency.

Dr. Nina Morley has demonstrated in a study on dogs that alcohol-induced hypoglycemia can be potentiated by pretreatment with tolbutamide. A method for assaying antibodies to insulin is being studied. This has provided a quantitative means of detecting the appearance and persistence of anti-insulin in guinea-pig sera.

Dr. Bruno Rosenfeld has continued to explore the relation of long chain fatty acid synthetase, a key hepatic enzyme in the transformation of carbohydrate into long chain fatty acids, to the problem of early fatty infiltration of the liver in choline deficiency. It has been established that after the ingestion of a single choline-deficient meal, the increase of triglyceride in the hepatic floating lipid fraction is quantitatively related to the increase of hepatic fatty acid synthetase activity induced by the same choline-deficient meal in the same rat. This finding permitted the conclusion that a regulatory function of dietary choline on the activity of this enzyme offers adequate explanation for the accumulation of hepatic fat in early choline deficiency. In collaboration with Dr. A. Kuksis, further independent confirmation of the correlation between increased formation of hepatic floating fat and this fatty acid synthetase has been obtained by the use of techniques of gas chromatography.

In Professor G. A. Wrenshall's section, research work has broadened from study on carbohydrate metabolism to include aspects of energy metabolism. With Drs. M. Vranic and A. Kuksis, plasma levels of nonesterified fatty acids and rates of nitrogen excretion are being determined, both in long-fasting and in exercising dogs. Concurrent tracer determinations of the rate of gluconeogenesis in the presence and absence of insulin are being made in the same animals. These studies indicate that, with insulin secretion, gluconeogenesis from protein is less than the tracer-determined rate of glucose appearance. This conclusion is dependent on the validity of the determination of the latter rate. The correctness of the determination was recently demonstrated by Mr. J. Cowan, with Dr. G. Hetenyi Jr. and Mr. D. Schachter.

Dr. C. C. Yip and his collaborators are continuing their studies on biosynthesis of the thyroid hormone, thyroxine, and of insulin. It has been possible to show that the purified thyroid peroxidase has ligand-binding characteristics similar to many ferric haemo-proteins. The enzyme forms an active complex with hydrogen peroxide and the complex retains two oxidizing equivalents per haematin unit. These observations support strongly the free radical mechanism proposed for the enzyme-catalysed formation of iodotyrosines and the eventual synthesis of thyroxine. Experiments are being carried out to measure mitochondrial respiration of rat thyroid tissues and the effects of injecting thyroid stimulating hormone (TSH) or feeding a goitrogen, propylthiouracil, are being studied. Mr. A. Zimmerman has begun studies on the effect of TSH on the iodinating activity of rat thyroid tissues and a biphasic response is obtained with increased activity beginning at 15 hours after TSH injection. C^{14}-

Leucine has been used to study the possible formation of insulin precursor in the pancreatic slices obtained from rabbits with ligated pancreatic ducts. Mr. A. Tung has begun his studies on this aspect of the biosynthesis of insulin in collaboration with Dr. B. J. Lin.

C. H. Best

Publications

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